

Mathematical tasks for living together: using difference as a starting point

Alexandra Gomes

CIEC/IE, University of Minho, Braga, Portugal

E-mail : magomes@ie.uminho.pt

Abstract: One of today's great challenges in education is to create conditions for everyone to live together, to recognize differences and to understand them. In this paper we present part of an ongoing study that aims at answering the following research question: Can mathematical tasks based on differences contribute to learning to live together? Two tasks and the comments from 4 pre-service teachers about those tasks are presented. Preliminary results indicate that pre-service teachers recognize the potential of such tasks for learning to live together.

Résumé: L'un des grands défis actuels en matière d'éducation est de créer les conditions permettant à tous de vivre ensemble, de reconnaître les différences et de les comprendre. Dans cet article, nous présentons une partie d'une étude en cours visant à répondre à la question de recherche suivante : Les tâches mathématiques fondées sur les différences peuvent-elles contribuer à apprendre à vivre ensemble? Deux tâches et les commentaires de 4 enseignants en formation sur ces tâches sont présentés. Les résultats préliminaires indiquent que les enseignants en formation reconnaissent le potentiel de telles tâches pour apprendre à vivre ensemble.

Nowadays we live in a society full of dissimilarities and distinctive cultures making it unavoidable for education to approach this diversity in order to contribute to greater knowledge and understanding of differences.

Mathematics can and should contribute to the recognition and acceptance of differences, promoting the coexistence of all (Banks, 1994; Zaslavsky, 1993).

The need to foster an inclusive mathematics that allows for the learning of all leads one to think about the kind of tasks that could be offered to students. One can assume that what students learn and experience is largely defined by the tasks they are given (Hiebert & Wearn, 1993). Not only should we use tasks that involve significant mathematics and stimulate students to make mathematical connections (Liljedahl, Chernoff & Zazkis, 2007), we can also use them to promote the development of citizenship. Therefore, teachers need to be aware of the affordances and limitations of a task in regard of the intended goals.

Method

For this study, we considered “difference” as a starting point for mathematical activities in the classroom. Thus, some tasks were designed/adapted considering a particular aspect that could be seen as “different”: different views, different perspectives, different definitions of a concept, ... All the tasks designed are about elementary mathematics.


The guiding question of this investigation is: Can mathematical tasks based on differences contribute to learning to live together?

In order to answer this question, four pre-service teachers were asked to comment the tasks, indicating whether they consider that these tasks could contribute to living together and, if so, how. In this paper, we present two of the tasks that were designed as well as the comments made by the pre-service teachers.

Tasks

Task 1

Observe the following images carefully.




Which can be the odd-one-out? Justify your choice.

This first task is a classification task. The development of the ability to classify is important to recognize properties in an object, to compare properties of different objects, to recognize a common property to several objects, to group objects according to a criterion, to choose a classification criterion or to discover the criterion used in a classification. In this case, the task has been built in order to have multiple possible answers. In fact, the odd-one-out can be any element, depending on the criteria.

Task 2

Observe the following figure.



What do you see? Talk to your colleague about what you are seeing.

This task plays with spatial perception, in particular with figure-ground perception (Del Grande, 1987). The idea is that children can discuss what they see and to conclude that they can see two different things (duck-rabbit) when the direction of the right-left observation is reversed.

Some results

As mentioned earlier, four pre-service teachers were asked to comment the tasks, indicating whether they consider that these tasks can contribute to living together and, if so, how. Considering task one, all pre-service teachers considered it to be an interesting task that can be used to promote discussions about criteria and difference. For example, one pre-service teacher said:

In my opinion, this task is important because it does not seek to find a single criterion, but rather a diversity of criteria. These criteria depend on the relevance attributed by who is

solving the task. In addition, it seems to me important to emphasize that each element of the set always has something in common with at least 2 other elements. Living together seems to me to be worked on, since there is always something that unites the elements and that their similarities are more significant than their differences.

Another pre-service teacher wrote:

In this task, we can organize the figures in various ways. For example, the shape of the figures (the rugby ball is different from the others because it is not round), the colour of the figures (all figures are orange, except for one, which is green), the object itself (there is an orange in the middle of a set of balls) and the size of the figures (the basketball is larger than the others). As we can see all objects have characteristics that distinguish them from others. (...) I like this activity very much to show students that regardless of our differences, we all belong to the same group, which makes us all equally important.

As for the second task, only 3 pre-service teachers considered that it could be used to discuss living together. One example of the comments is:

The image of this task can be interpreted in several ways. What we observe first will depend on each person's point of view. Although different animals can be perceived, the image is the same and all the perspectives are right. It helps to understand that the perception of the other is important and as legitimate as ours, so it must be an opportunity to interpret the world and put oneself in the other's shoes.

The other pre-service teacher argued that she could not understand how this task could promote living together. In her opinion:

this activity separates people, forming one group that sees one image and another that sees another.

Some concluding remarks

These first results show that pre service teachers consider that these mathematical tasks based on differences can contribute to learning to living together. Further investigation into this problem is needed. There is another phase planned within this study in which the tasks (already revised based on teachers' comments) will be tested with primary school children and revised again.

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