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Dr. Denise Alves de Araujo
Dr. Maria de Fátima Cardoso Gomes
Cultural Historical Psychology Classroom Research Group – GEPSA
Faculdade de Educação – Universidade Federal de Minas Gerais - Brasil

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We present here the results of a research that discusses the appropriation of school concepts, especially mathematical ones in Adult Education classrooms.

In order to understand the processes that take place in the classroom we seek support in Cultural-Historical Psychology, especially in the work of Vygotsky. With this theoretical-methodological reference, in dialogue with Ethnography in Education, an analysis was developed using the concepts of “lived experience” (perejivanie) and “instruction” (obutchenie).
Research Question:

How do adults appropriate mathematical concepts mediated by school instruction?
THE UNDERSTANDING OF THE SCHOOL CONCEPTS APPROPRIATION PROCESSES BY ADULTS USING THE CONCEPT OF LIVED EXPERIENCE (PEREJIVANIE)

Why conduct such a research?

- In Brazil, there are millions of people over the age of 15 who have not been able to complete Elementary School.
- There is little research in this context inserted in the field of Cultural-Historical Psychology.
- Persistence of a discourse that generally describes the Adult Education student as someone with learning disability.
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Research Instruments: participant observation

- Audio and video recording of classes;
- Interviews with students and teacher;
- Field notes;
- Artefacts (registration forms, class diaries, school activities, etc.)
Some of the concepts used in the research

- **Appropriation** - concerns participation in social practices, the use of language, ways of exercising this participation, of accessing knowledge, including school knowledge. (SMOLKA, 2000)

- **Instruction** (*obutchenie*) - involves the activity, the orientations, the intentions, the self-instruction and what actually occurs in the classroom. (PRESTES, 2010, VIGOTSKI, 1993/1934)

- **Lived experience** (*Perejivanie*) – unity between the social situation and the person's consciousness, between affection and cognition. (JEREBTSOV, 2014; NEVES, KATZ, GOULART & GOMES, 2018; PRESTES, 2010, VIGOTSKI, 2018)
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The research context

- The research was developed in two beginner classes in an Elementary Education course for adults during a school year.
- The course is part of an extension project of a federal university in the city of Belo Horizonte, Brazil.
- The teachers of the course are undergraduate students.
- The students of the course are people from the community and were, at the time, between 24 and 79 years old. Many of them were retirees, housekeepers, salespersons.
- At first, the classes of all subjects were followed up and, after three months of observation, the math classes began to be recorded in audio and video.
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The research context

- With the theoretical and methodological assumptions of Ethnography in Education we seek to understand what was happening in those classrooms, understanding that each event is constructed historically by the people.

- A sequence of classes with the potential to reveal the students’ appropriation processes was chosen and discursive sequences in these classes were selected for analysis. The subject approached in the classes was equivalent fractions.
Lived experience, school instruction and appropriation of mathematics as a language

- Particularly for this presentation, we have chosen a discursive sequence that shows how the appropriation of mathematical language is an important part of the inclusion of students in the mathematics classroom.

- This sequence happened after the teacher resumed several problems about fractions that had already been studied. The passage deals specifically with a situation presented by the textbook in which a woman sells pies. At first, she sold $\frac{3}{8}$ of the pie. Then she decides to split the pie into 16 pieces.
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Discursive sequence

Teacher: So / there / three eighths is equal to / six sixteenths / it’s also an equivalent fraction.

José Geraldo: That is / three eighths / is equal to six sixteenths / is equal to one integer.

Teacher: NO / it's not equal to an integer.

José Geraldo: Corresponds to the same integer?

Teacher: What?

José Geraldo: Is the correspondence of an integer?

Teacher: It corresponds to the same part of the whole.

José Geraldo: Of the whole.

Teacher: If she sells three eighths / OR six sixteenths / of a pie that is / the SAME SIZE ... / take two pies / one divided in eight pieces / the other one in 16 / take three of this and six of that / you’re taking the same part.

José Geraldo: Can I say / that like (...)

Teacher: No.

José Geraldo: That it's equal to the whole / that it equals an integer / is it the same thing?

Teacher: No / because it doesn’t correspond to the whole / doesn’t correspond to an integer / it’s a FRACTION of the integer / Fraction of the whole / Ok?
In the sequence we see José Geraldo's effort to find the right terms to express himself.

The student had already successfully solved the problem, the effort shown in this discursive sequence did not seem to be one of understanding the problem, but of using the language.

Jose Geraldo's concern with language in mathematics class was also recurrent when it came to writing. He saw himself as a person with difficulty in writing in the language expected by the teacher and attributed such difficulty to his experience as a truck driver, an activity that, at the time he practiced it, did not impose writing as something essential.
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Excerpt from José Geraldo's testimony

I have always done ::: / ahm ::: / I’ve done much more / memorizing / than writing / I HAD to do this / when I worked / ahm :::: / mainly in the truck / we caught cargo / in places far away / the boss didn’t know / where we would call him from / look, there's a load here / charged per ton / how much would I charge / how much would I not / how much oil would I spend / how would the profit be / all that / I didn't / didn't know / very well / how to do that / I did it in my head / I would call him / And say / look / it's going to be that much to charge / that much profit / THAT'S IT / and I LIKE math / sometimes I have difficulty / because / I have difficulty / to put it on paper / I have no difficulty with the subject / I have difficulty / to put the subject on paper.
This fragment of the interview with José Geraldo shows a situation in which he solved problems in his professional life as a truck driver. It is not only a math problem, but a crucial one for his own survival. This experience was not limited to the objective situation (to obtain lucrative freights for the boss), but it showed the unity between the social situation and the conscience of Jose Geraldo.

What he identifies as "difficulty" reflects his own process of appropriation of mathematical knowledge that has been constructed in other spaces outside the school and that finds barriers, in his view, to be legitimized as knowledge by the school.

The knowledge of the language of school mathematics is not guaranteed by the knowledge of the mother tongue. It's a specific code, not always necessary in everyday life, but almost always indispensable in school. For José Geraldo, "learning mathematics" is not only solving problems, but mastering the mathematical language that is valued at school.
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Final considerations:

- The forms of expressing the relation between equivalent fractions and the whole (or the integer), put by José Geraldo in the discursive sequence are examples of the importance of different languages (pictographic, algebraic, verbal, etc.) as semiotic mediators in the process of appropriation of mathematical concepts.

- The encounter and the shock with the language of school mathematics do not occur only in the use of signs proper from this field of school knowledge, but also in the words that are used to explain the concepts.

- The appropriation of mathematical concepts in school involves the appropriation of the languages of school mathematics, which are not a premise but the means by which concepts are appropriated.
With this research we offer evidence that reveals the development of adults, driven by school instruction as a complex, multiple and sometimes sophisticated process, insofar as it reaches depth in the relations with everyday life and within the logical body of school mathematics itself. Adult people's life history cannot be separated from the cognitive processes that they live in school. It is the affection-intellect unity, the lived experience (perejivanie) that shows us how adults learn at school.

Some images from José Geraldo's classroom...
REFERENCES:


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Thank you!
Obrigada!

deniseaaraaujo@hotmail.com
mafacg@gmail.com