

HOW THE GEOMETRIC CONSTRUCTIONS HELP THE UNDERSTANDING OF COMPLEX NUMBER?

Estela Kaufman Fainguelernt
UNESA/ UNIVER CIDADE
estelakf@openlink.com.br

Franca Cohen Gottlieb
Universidade Santa Úrsula
ogottlieb@abc.org.br

Introduction. The objective of this research was to analyze how the geometric constructions used in activities of dynamic geometry help students and teachers to produce meanings for the body of complex numbers. The research took place during the 2000 and 2001 years in an institution that prepares undergraduation teacher located in the western part of Rio de Janeiro, Brazil.

Participants of the research. Participated in the work two students and two teachers from the Undergraduat Course in Mathematics of the University. The two students had different preparation levels. One already knew complex numbers in an algebraic and automatical way and the other one never had studied this subject. The two teachers were engaged in mathematical investigation and were much interested to learn new methodologies for the construction of the meanings of mathematical concepts.

The framework. To analyze the development of the activities we used Tall (1981) who treats the formation of concepts of mathematical objects and also Hershkowitz(1994) who formulates an outline about use of the definition of concept to students. We tried to understand how the learner appropriates the mathematical concepts. We observed that human mind do not act exactly in accordance with symbolic logic. The concept is built by different experiences and approaches arriving to what Tall calls the "Conceptual Image". Tall created also, joining the words "procedure" and "concept", the name "procept" to designate the process to the construction of a concept. Since we worked with dynamic geometry we created activities using, as a tool, Cabri Géomètre II software. The environment provided to students the possibility to creat, to conjecture, to elaborate and to represent contents.

Conclusion. The student who had not previously learned about complex numbers built its concept better and in more appropriate way than the other one. We conjecture that use of visualisation in the geometrical approach is more effective than the algebraic approach. The teachers were glad to learn a new way to introduce complex number in the classroom.

References.

- Fainguelernt E.K.- *Educação Matemática: Representação e Construção em Geometria-ARTMED* ed . Porto Alegre –Brasil-1999.
Hershkowitz, R.- *Aspectos Psicológicos da Aprendizagem da Geometria-* Boletim GEPEM, nº 32, pg 3 – 31 Rio de Janeiro- Brasil – 1994.
Tall D.- *Cognitive Growth in Elementary and Advanced Mathematical Thinking* – Proceedings of PME19-volume1 pg 61-76 –Recife-Brasil-1995.
Tall D. e Vinner S.- *Concept Image and Concept Definition in Mathematics* –Educational Studies in Mathematics 12 pg151 – 169 –1981