

PRACTICAL STAGES OF INTRODUCTION INTO SONORIC REGISTRATION OF ELEMENTS' ARRANGEMENT

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ABSTRACT

In the paper the succession of stages of education of the totally blind users of sonic digitizer has been presented.

The educational establishments in Poland can be divided into four following groups:

- pre-school education either in nursery schools or in form "0" in any of the two types of primary schools,
- 1st – 6th forms, with internal subdivisions 1st – 3rd, 4th – 6th.
- high school

The researches connected with applying sonic method into practical education of the blind have been realised in the educational Centre for Blind Children in Wrocław. The totally blind pupils attending primary school were tested the collection of educational tests according to the programme of mathematics, biology and geography. In Poland new system of integrated education on the level of 1st – 3rd forms has been introduced.

The first mental process, where the sonic method should be helpful, is *symbolisation* of object and *recognition* of its representation. Blind pupils start to recognise the object firstly by touching and then by hearing. As the first group of objects the figures: squares, triangles, rectangles and circles coded sonically to the scale 1:1 have been used. Introduction of chosen representations from a group of objects such as vegetables and animals have been proceeded according to the programme of integrated education in 1st – 3rd forms and, since 4th form in the frame of separated subjects: biology or mathematics.

The notion of the scale seems to be especially important in education of the blind. Beginning from the scale characterising the sonic representations of articles from the nearest surrounding such as: spoon, plate, comb, pen, ruler, a blind pupil has to recognise a contour of a table and then – a scaled symbol of a room (Fig. 1). Pupil learns scaling from the scale 1:1, then in the 2nd form scale 1:2–1:5 and finally 1:20 (Fig. 2). The range of scale transmission is limited but the sonic method seems to be to the blind's advantage, because the process of imagination is practised. In the end of 3rd form the pupil has to recognise a generalised shape of Poland (Fig. 2). On the second stage of education (1st – 3rd forms) only parallel projections of objects have been used.

Sonic method appears to be very useful for *differentiation* of signs representing objects and – for *comparing* the pairs of elements. Sonic code is based on the metric system, so the comparison between different sectors or figures leads to determination of their sizes (*measuring* by hearing).

The recognition of sonically coded geographical scenes is a natural consequence of earlier work with several artificial scenes, composed from a group of well known objects, e.g.: an envelope with the stamp, a table-ware, furniture in the room. Pupils begin to learn relative positioning of elements (points, open lines and contours) in the 3rd form of education.

As a first trial of orientation, the lay-out of hands showing: three o'clock is recognised and than: nine, six, twelve o'clock. As the geographic al objects: the river Wisła and the capital Warsaw within the borders of Poland have been chosen to teach the relative position of lines and points (Fig. 2).

After the second level of education, the blind pupil can use sonically coded scenes to recognise the continents. After the third – the countries within continents. Sonic method appears to be useful create blind pupil's spatial imagination.

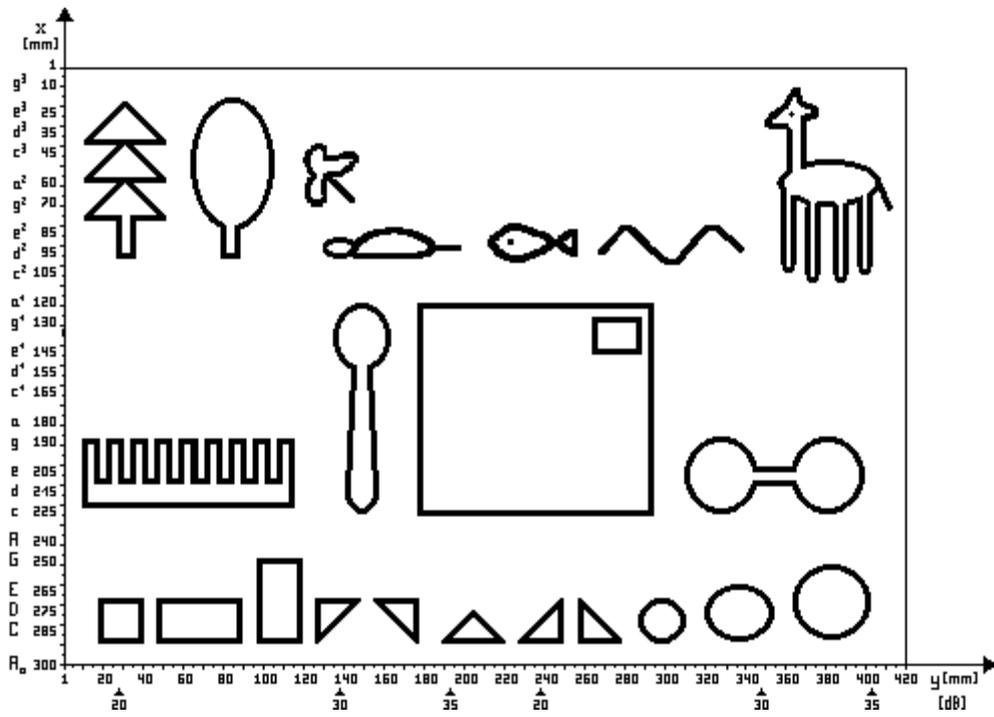


Figure 1. Symbolisation and scaling of the objects.

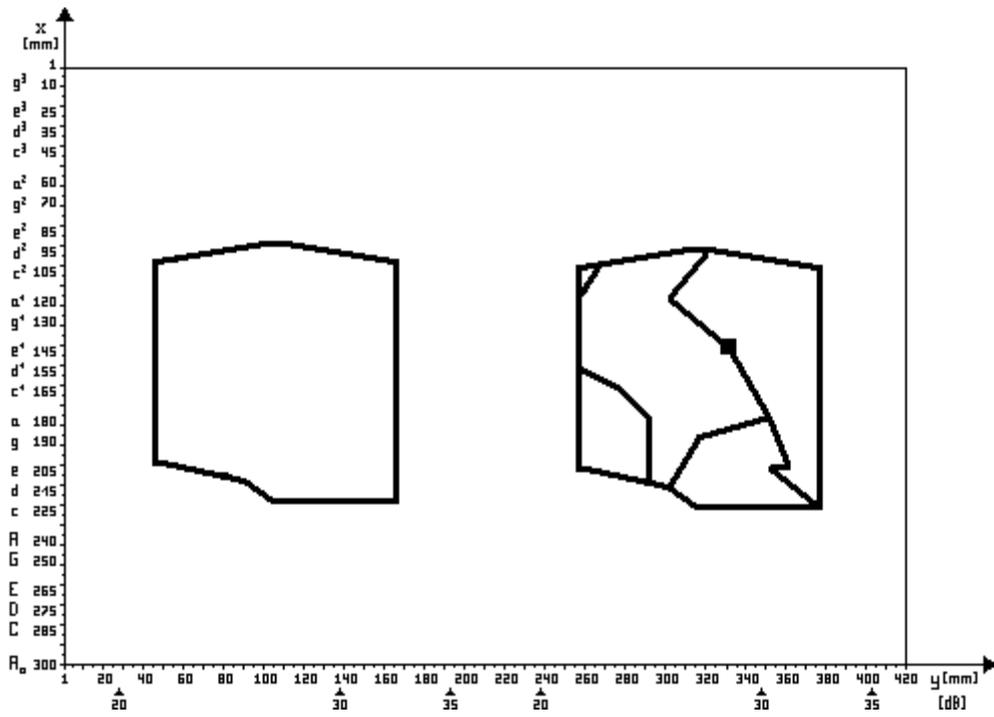


Figure 2. Generalised shape of Poland.

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Biographies:

Ewa Krzywicka-Blum

Prof. Dr. Ewa Krzywicka–Blum holds a Diploma of Mathematics from the University of Wrocław and MSc in Geodesy from the AGH University of Science and Technology in Cracow, and a PhD in Geodesy from Agricultural University of Wrocław collaborating with professors: Hugo Steinhaus and Jan Mikusiński in the field of mathematical analysis. Then she decided to continue her research interests in the field of application of mathematics method in cartography and geodesy.

She started to work in the Agricultural University of Wrocław as an assistant in the Department of Higher Geodesy. Current she is Head of the Department of Geodesy and Photogrammetry, Agricultural University of Wrocław. Several years ago (1988–1996) she was also a professor of cartography in the University of Wrocław, Institute of Geography.

Prof. Ewa Krzywicka–Blum is a member of Committee of Geodesy (Polish Academy of Sciences), Wrocław Scientific Society, National Committee of ICA. She headed the ICA Commission on Gender in Cartography. She is author of 135 published works and co-owner of the patent connected with the sonorical method of mapping.

Janusz Kuchmister

Mr. Janusz Kuchmister was studied in 1976-1981 at the University of Agriculture in Wrocław at the Department of Geodetic Agricultural Engineering. He was bestowed the title of Master Engineer in the discipline of Geodetic Agricultural Engineering.

Since 1981 he began to work at the Department of Geodesy and Photogrammetry as the assistant and furthermore, he was promoted to the senior assistant.

In 1992, after the defence of his doctoral thesis at the Faculty of Military Engineering and Geodesy, Military Technical Academy in Warsaw, Ph.D. Janusz Kuchmister was promoted to the senior lecturer in the Department of Industrial Geodesy, University of Agriculture in Wrocław.

In 2000 Ph.D. Janusz Kuchmister was granted the 1st class engineer of professional specialisation. Since 1993 he has been a member of the 4th Working Group “Geodetic Instrumentation” within the section of Industrial Geodesy of the Polish Academy of Science. He is also the member of the Assembly of Science and Technology in the field of Geodesy, Cartography, Cadastre and Navigation of the Engineering Academy in Poland.