

AN EXPERIMENTAL APPROACH FOR TEACHING STATISTICS IN THE EGYPTIAN SCHOOLS

Reda Mosad El-Said Asar
Menoufia University
Egypt

Teachers of mathematics in Egyptian schools almost depend on traditional lectures and discussions in teaching the statistics units which concentrate often on either mere computational aspects or theoretical concepts and distributions. To change this situation, an experimental approach is suggested to be used in Egyptian schools as a useful base for teaching and learning the subject in these schools. Questions interspersed throughout the experiments intend to promote statistical thinking among students, to help them to discuss the results obtained and to formulate final conclusions. One of the basic features of the approach is to give students the chance to use some of the methods used by real statisticians, then to find out relationships, new meanings and findings for themselves. By using such an approach, students can collect, analyze data and discover things by themselves. A field study conducted for preparatory stage students in Egypt (11 - 14 years old) has revealed the effectiveness of the suggested approach in achieving its goals.

INTRODUCTION

Recently, mathematics curriculum in Egypt has witnessed many new developments in both its contents and methods of teaching. As a result of these developments, statistics has become a major part of mathematics curriculum in all of the Egyptian schools. A lot of interest is paid by mathematics teachers for teaching statistics in practical, meaningful, and experimental ways. The major purpose of this paper is to describe what we will call the experimental approach, its possible uses in teaching statistics in general, and some guidelines for using it in developing teaching of statistics in the Egyptian schools during the last few years and in the future.

STATISTICS IN THE EGYPTIAN SCHOOLS

Generally speaking, statistics in the Egyptian schools is taught within mathematics syllabuses (El-Said, 1994). At the primary school, syllabuses emphasize basic statistical skills such as data collection, data tabulation, data summarization, and data representation by graphical or pictorial methods such as histograms, bar graphs, etc. At the preparatory school, basic numerical measures such as mean, median, mode, and measures of dispersion, are dealt with in detail. At the secondary school, some advanced topics of statistics are to be studied such as correlation, estimation, and significance testing (El-Menaufy, 1991a). In all schools, statistics is usually taught by the mathematics teacher as a part of mathematics curriculum.

PROBLEMS OF TEACHING STATISTICS IN EGYPT

The problems of teaching statistics in the Egyptian schools are most serious than in other areas of mathematics curriculum. There is – as illustrated above – a large difference in the level between what is taught in the primary school, in the preparatory school and what is taught in the secondary school. To overcome such difference, the connection between statistics content and everyday experience needs to be strengthened to make students believe that statistics is a practical, interesting, and meaningful subject instead of their traditional feeling of it as theoretical, difficult, and boring subject (El-Said, 1994).

EXPERIMENTATION WITH STATISTICS IN SCHOOLS

To overcome most of the statistics teaching problems encountered students in our schools today, Egyptian teachers should move from theoretical teaching they commonly used in the statistics lessons to experimentation. The major object of experimentation is to get students to use some of the methods which statisticians use and so find out for themselves. It simulates the mode of working among the students and the interest of the practical work inside and outside the classroom (Somers, et. al., 1996).

THE EXPERIMENTAL APPROACH USED

The experimental approach used in this study is intended primarily for those students who want to gain a practical working knowledge of some of the more important elementary statistical procedures in present day use . It represents a useful practical basis for their work. The approach is also suitable for use as a supplementary to the theoretical teaching dominating those days in our classrooms (Piccolino, 1996). The experiments used under this umbrella of the approach are designed to encourage students to discover things for themselves. The experiments are intended not only to illustrate the practical uses of various elementary statistical methods but also to be interesting and to lead to further experiments in which the student is encouraged to investigate more statistical problems for himself in his own way (May, 1990).

DEVELOPING TEACHING STATISTICS IN EGYPT

To develop teaching of statistics in the Egyptian schools , the theoretical approach commonly used by teachers must be altered by the experimental approach. While the former approach approved to be inappropriate nowadays for teaching statistics , the later approach achieved a tremendous success locally and internationally (El-Menoufy, 1991b; Hollis, 1997).

RESEARCH EVIDENCE

To have a research evidence of the benefits of the experimental approach in developing statistics teaching in the Egyptian schools, 797 student enrolled in the first and second grade in the preparatory school in three major areas in Egypt (Menoufia, Dakhilya, & Damitta) participated in an experimental study. During this study, students were taught statistics lessons in the form of practical experiments instead of the theoretical lessons they used to deal with in their schools.

The experiments were written out for students in full, but specimen results were not supplied. All the data to be analyzed were produced and collected by the student. Through the experiments, some statistical questions were interspersed to promote thought about the lesson in hand and to help students to discuss their results and formulate their conclusions themselves. To get more benefit from this approach, the experiments used were graded in difficulty in that rather easier ones tend to be found at the beginning, with longer experiments, requiring a slightly more advanced knowledge, towards the end of the study program (Kapadia, 1982; May, 1990). Each experiment required 6 stages to be carried out and 7 stages to be written up. The study lasted for one school term. Beside the major researcher, 15 teachers of mathematics were trained and participated in the study .

STATISTICAL ANALYSIS AND RESULTS

The statistical analysis of the results revealed that the experimental approach is superior to the traditional theoretical approach in teaching statistics in Egyptian schools. Teachers of statistics found the experimental approach helpful to overcome plenty of the problems they often face with the traditional theoretical approach . It reduces the time required for giving study instructions , eliminates the need for writing tables of results on the board and increases the opportunity for giving individual help where it is needed by the students in the classroom . Finally, based upon the above results the experimental approach is recommended as a nontraditional approach to develop teaching of statistics in the Egyptian schools.

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