

## **Census at School: Gathering real data from and about school students in elementary school in Greece**

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### **Abstract**

The present paper refers to the pilot test of the Census at School project of Royal Statistical Society Centre for Statistical Education (RSSCSE). It is an international project collecting real data from elementary school students to create a database that aims to exploit as a source for teaching and learning statistics. Having the intention to propose the integration of the schools of Greece in this international program we tried an experiment through the process of collecting, recording, analyzing, describing and interpreting the data from a questionnaire applied to 375 students of the 105<sup>th</sup> Primary School of Thessaloniki, aged 6 to 12 years. The questionnaire was derived from the program slightly differentiated and adapted to the Greek reality. The aim of the application was to identify the capabilities within the Greek educational system, which provides the program in terms of encouraging students to engage in the management of facts. From the research found that the recommended tool could adequately respond to the educational needs of students in primary education, helps active involvement in the research process and thereby contribute to the development of statistical skills. As a corollary proposed cooperation between our country and the program to generalize its use.

Keywords: teaching statistics, real data handling, census at school

### **1. Introduction**

#### A. What is the Census at School Project?

Census at School is an international project based approach that involves students in solving real life problems using statistics. As it is reported “it is an international project that gathers real data from and about school students and returns the data and teaching and learning recourses to them and their teachers” ([www.censusatschool.org.uk/international/images/stories/getinvolved-1.pdf](http://www.censusatschool.org.uk/international/images/stories/getinvolved-1.pdf)).

The aims of the program consist of: (a) involving students in collecting data about themselves, (b) fostering a positive attitude to statistics through using real data that interests the students, (c) enhancing the process of teaching statistics, (d) encouraging effective Information and Communication Technology (ICT), (e) providing access to large and meaningful data sets and (f) making comparisons between the student responses in different countries ([www.censusatschool.org.uk](http://www.censusatschool.org.uk)).

#### B. Describing the program.

In the program, students under the guidance of their teachers supplement an anonymous, online questionnaire and submit it to a national database. Questions concern issues related to everyday life and interests (favorite subject, hobby, sport, etc.). Thirteen questions are common to all countries participating in the program, but each country may add their own questions depending on the specific interests of the students. Thirteen common questions periodically climb into an international database

that is hosted in the United Kingdom. To complete the on line survey each student takes about 15-20 minutes. After students respond to the research, teachers have direct access to the data rate which could be used to teach statistical concepts, measurement, data analysis, build graphical representations and interpret distributions. Students can compare their data with random data samples of students from other classes around the country or other countries.

### C. Pedagogical dimensions.

Census at School is a pedagogical approach on teaching statistics that utilizes active learning (Beswick, 1987) process through real life situations (Ojeda et al., 2012). The development of students' statistical thinking is achieved through learning activities which allow children to get involved in real world problems, using methods and procedures with real life data sets, as well as apply statistical methodology to obtain conclusions and recommendations in the context of the research problem (Everson et al., 2008). The fundamental strategy of statistical education involves (a) pedagogical reforms toward development of conceptual understanding and teaching to statistical thinking and reasoning, (b) changes in the content of statistical courses, (c) improving the instructional techniques used in statistics courses, (d) integration of technology and computer based methods into teaching statistics as a tool for effective pedagogy (Tishkovskaya & Lancaster, 2012). Chadjipantelis et al., (2002) note that teaching through activities is the most appropriate method to increase students' performance in the concept of statistics. Fernando & Karunaratne, (2013, 1), refer that "technology plays a vital role in teaching and learning statistics" because it "has changed the way of thinking and teaching a statistic class". The use of real data contributes to active learning and leads to statistical thinking (Fernando & Karunatatne, 2013). Nowadays, real context is available from a variety of sources. Students can collect their own data from interest and this is a preferred source to involve to the issues (Binnie, 2002). The possibility to collect, analyze, interpret and make inference (Chadjipantelis, ae al., 2006, Fernando & Karunaratne, 2013) strengthens the involvement with census at school project.

### D. Who can participate to the project? What about Greece?

The program was initiated from Royal Statistical Society Centre for Statistical Education at 2000 in cooperation with National Statistics Office (UK) in order to provide students' statistical literacy utilizing real life data and ICT. By now, it is applied in Australia, New Zealand, Canada, USA, South Africa, Ireland, Japan, Korea and UK.

Through these partnerships students of different countries are brought together with the lifestyle of other students and can also compare morphological characteristics, habits, level of education, living conditions, attitudes and perceptions, etc.

As the use of real data of interest may motivate students towards further statistical research, enhance their enthusiasm and involvement in statistics and bring them in contact with millions of other students, we appreciate that it would be useful and appropriate to suggest the involvement of our country's primary schools to the census at school project's network. For this purpose, we have implemented a pilot questionnaire corresponding to the questionnaires of the project submitted to the students of a primary school in Thessaloniki.

## 2. Results

Interpretation of the project faces.

Having the questionnaires of the project which are posted on the websites of the

participants in the census at school as a guide, we designed, in collaboration with the students of 5<sup>th</sup> and 6<sup>th</sup> grades of the 105<sup>th</sup> Primary School of Thessaloniki, a new questionnaire, in which we incorporated the 13 common questions for all countries, and based on students' suggestions we added questions about their daily lives, their habits, their perceptions of social issues. Then, we printed the questionnaires and submitted them to all students of all grades of the school (approximately 400 students from grades 1 to 6). Students of 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> grade worked in groups to collect the data. They formed even numbers of small groups of 4-5 students and collected data in pairs. The teachers took up a prompting role. All the necessary instructions were given to the students who attended the data collection process without interference. After the completion of the collection process in the high classes, students organized themselves in groups and applied the same questionnaire to students of grades 1, 2, 3 assisting them with the measurements and helping them to complete questionnaire forms, acting as enumerators. From this process, we collected 375 questionnaires in total of 418 students.

The collected questionnaires were recorded in a digital database from the students of grades 5 and 6. After thorough discussion in classes, data were coded and registered in an electronic form with the help of the computer teacher cooperating with the English teacher. Data entry is done by the students themselves who have worked with their teams. In that phase, the computer teacher designed an excel table in which the data was entered by teams. After registration, the teacher of ICT brought small-scale editorial corrections in order for the table to be functional. From the data entry process emerged a table in which all responses from the questionnaires completed by the students (375 entries) were coded.

The next stage was the statistical analysis of the results. In the class of mathematics, which involves statistical teaching 5<sup>th</sup> and 6<sup>th</sup> grade students proceeded to determine the measures of central tendency (mode, median, mean), graphic representation of the distributions and the interpretation of results in relation to the real situations. The teachers of the classes gave students other data from relevant investigations carried out within the census at school project, providing an opportunity to compare and find similarities and differences in the responses of students from different social frames. The results were recorded in writing reports after discussion in the classes. All data were sent to the administrator of the census at school project in order to be validated and compared to the data of other countries.

### **3. Conclusion**

Advantages and disadvantages of implementing.

The pilot test of census at school at 105<sup>th</sup> primary school of Thessaloniki resulted in students showing great interest in the research process at all stages. They involved actively in questionnaire design, data collection, coding of responses in the data entry into an electronic database, statistical processing and analysis, interpretation and conclusions in the form of printed reports. With their actual involvement in the process, students discovered the value of inventories and had the chance to use statistical measures and graphical representations to capture documents and understand the statistical distributions. What is more, students had the opportunity to use ICT and discover the possibilities of the tool. The research process can be applied in the context of the courses of mathematics, information technology, English, geography, language lessons, cross-curricular working.

During the data collection process, difficulty has been found in the measurement of young pupils and in managing the allotted time, which is often not sufficient for the completion of data collection, creating anxiety among younger researchers, who rushed to finish in a short time, at the expense of data accuracy. Nevertheless, the interest of students remained consistent until the end and the results of the pilot were

satisfying.

For this reason, it is our intention to formally request the inclusion of the primary schools of Greece in the network of countries participating in the program on equal terms and generalize its implementation in schools. This effort requires cooperation with the Ministry of Education, the Greek statistical authority, Aristotle University of Thessaloniki and representatives of primary school teachers.

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