CENSUSATSCHOOL 2000: CREATION TO COLLATION TO CLASSROOM

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The CensusAtSchool project involves young people between the ages of 7 and 16 in gathering some simple information about themselves, which then form the basis of a national database for school children to use for data handling within many varied subject areas in school. At the very heart of the project the CensusAtSchool website http://www.censusatschool.ntu.ac.uk gives schools the opportunity to access and use the web within a learning environment. Summary data is posted on the site for schools to use along with a variety of curriculum tasks, which encourage greater use of ICT methods. South Africa and Queensland have both taking up the project within their own regions so expanding the project into providing opportunities for international comparisons to be made. The beauty of CensusAtSchool is that the data is real and the pupils themselves are fully involved.

INTRODUCTION

Who would have thought that a single A4 page of very simple questions would develop into the very grand sounding 'International Project to promote Statistical Literacy around the World'? This is the story of *CensusAtSchool* with its dual thrust to enliven data handling activities within the classroom while also educating children about the principles and processes involved in conducting a census. It brings ties between government and schools and a level of statistical awareness into a world that for many years has seen little use or meaning in the data handling and statistics techniques and procedures taught in the classroom. Pali Lehohla, Statistician General of South Africa says in a video explaining the project *'CensusAtSchool brings the data home, to the people and the teachers and they can then relate to it'*. Thami Mseleku, Director General of Education in South Africa also endorses the project saying '*This is critical to develop the kind of literacy and attitude to census that is more positive and therefore more conclusive to proper information'*.

The project was born in the UK where the Royal Statistical Society for Statistical Education (RSSCSE) saw the UK's forthcoming 20th national census in April 2001 as an opportunity to take the message of census actively into the classroom and get children involved in providing some real data about themselves. These data could then be used to give coherence to statistical techniques that all too often are taught as a series of isolated and dry procedures in many UK schools. As the UK's National Numeracy Strategy Framework says '*Real data present problems that 'textbook' or contrived data can skirt around, by using them pupils will gain useful transferable skills.*' (Department for Education and Skills, 2001). The other great idea was for the project to centre on a dedicated website – *http://www.censusatschool.ntu.ac.uk*. The website is the hub of the whole project. It is designed to be both accessible and simple to use. Documents use common formats that with which teachers are familiar, and that enable schools to download material cutting out the costs of hard copy. Initial funding came from the UK government's numeracy initiative Maths Year 2000 as well as donations from the Royal Statistical Society and the UK Office of National Statistics (ONS). ONS saw the project as a superb way of publicising the adult census in a fun and non-threatening way. They also saw potential to get the census message into households where English was not the adult language via their UK educated children, a group historically nervous of censuses.

CREATION

The aims of the project are to:
- Improve pupils' data handling abilities;
- Involve pupils in collecting data about themselves;
- Encourage teachers to use the Internet for educational purposes;

- Provide data and contextual material for teachers and pupils to use in their schoolwork across all subjects;
- Encourage effective ICT teaching and learning;
- Demonstrate the purpose and processes involved in sampling and censuses.

During May 2000 a pilot survey was completed involving 8000 children aged 7 to 16 from some carefully selected areas across the UK. These included a large rural area, a city, suburbs and a group of schools from Wales. Evaluation of this pilot enabled us to develop the project to ensure that it would be directly useful within learning and teaching activities in schools. It was decided to have two questionnaires; one targeted at children aged 7 to 11 and the other for 11 to 16 year olds. The forms had a lot of overlap but there were a few differing questions. Each questionnaire was divided into three sections, namely, about the child themselves, their household and their school life. The questions included a few identical to those on the adult census but also there were a selection of questions which would be of direct interest to the children themselves such as favourite football team and what pets they had at home. The questions were so constructed so that they fitted onto 1 side of A4, both for conciseness and for ease of use in the classroom. Documents giving teachers notes and explanations for the questions were developed and translations made into Welsh and Irish.

To get the message about *CensusAtSchool* into schools we developed a simple 3-way fold leaflet giving details of our aims, the project and the website address. We asked schools to register an interest on a web page that sent the information into a database. An automatic e-mail was returned which encouraged schools to look at the website and download all of the documentation they needed. We did find a problem with incorrect e-mail addresses being entered and a large number of schools that expressed interest did not have the level of technology we had been led to believe they had. However *CensusAtSchool* does not depend on any particular level of technology and we sent out hard copy of the vital documents to any school expressing an interest so they could still participate regardless of whether they actually had web access or not.

We had a tremendous response with about two and a half thousands schools registering on the website equating to nearly half a million pupils. All types of schools registered, primary, junior, secondary, special, home tuition services etc. A number of schools in rural areas said that it was an ideal way to involve their pupils in a wider exercise involving other similar schools. We offered two routes to getting the data back to us. Schools could either use a program called Pinpoint that stored responses into a file, or they could conduct *CensusAtSchool* as a paper exercise in the classroom. This second method in particular offered the opportunity for children to learn about census. A couple of children from each class acted as enumerators, as in the adult census and transferred the data onto an electronic Excel sheet which could be either e-mailed back to us or sent via a highly technological upload procedure on the website. The intention was that, by giving children a greater understanding of the processes involved in conducting a census in their own classroom, they would not only learn but would take into their households questions and comments regarding *CensusAtSchool*, thus creating an interest and link with the adult census.

COLLATION

Schools were asked to complete the project as near as possible to Oct 29th 2000 which was the date exactly 6 months prior to the adult census, thus emphasising the awareness of this event. The teacher help line we set up was extremely busy during September, October and November with teachers asking for assistance concerning a wide range of problems ranging from using and moving around the website to downloading and uploading problems, requests for assistance with Spreadsheets in general, and Excel in particular. It was very satisfying to be able to guide these teachers through the technology and be online to hear the reaction as they succeeded. The transfer of the individual questionnaire data onto the Excel spreadsheet was a task that we knew to be tedious and time consuming and indeed, a few schools did complain about this. However, those who had followed our guidelines to do this using appointed pupil enumerators, commented how this process really brought home to the children how data transfer can cause problems both in terms of time and errors in transcription. (A part of data handling that is all too often done behind the scenes in schools.) Getting children to look carefully at the

process of collation gives them insight, not only into the necessity of using computers to help speed up collation processes, but also at how data can so easily become corrupted or altered purely by accident. It also enabled pupils to gain spreadsheet skills. The data was returned to us over the next couple of months although we did continue having schools contact us, saying they had just heard of the project and asking if they could become involved.

By the end of December 2000 we had collected enough data to begin the analysis and by February 2001 we were in a position to release the initial results to the press. The Census Initiatives unit of the ONS created a series of tables of summary data and we looked at overall results and created some spreadsheets of 'chunks' of data that we thought might well be useful to teachers. A press release was written and then on 26th Feb 2001 the results of CensusAtSchool were made public (see Figure 1). The press coverage we received was quite amazing with all national newspapers in the UK running it as a major story. Local and national radio and television were heavily involved. We included some children's height data from 1837 as well to provide a comparison with our current height data. This along with the results of the technology question about Internet access and mobile phone ownership were picked up by a number of the papers with headlines such as '*Why boys of today look down and girls', 'The mobile phone generation walks tall'* and *'Why all today's youngsters are in higher education'*.

We conducted very many interviews on radio and many local stations were particularly interested in differences found between areas of the UK. Our local newspaper in Nottingham, the Nottingham Evening Post, even had an editorial comment relating to

Figure 1. Cutting from The Daily Express Feb 26th 2001

support, or not, for local football teams as well as a sizable article and even a cartoon bemoaning the finding that cats were more common pets than dogs. BBC Newsround – *the* children's news programme in the United Kingdom, gave us coverage, as the project was running and later to cover the results. Regional programmes showed schools participating in their areas. Children who took part were excited and pleased to see the project receive such extensive press coverage. This emphasises the interest and enthusiasm that can be generated by personal involvement in data handling and the need to involve children fully in real collection, and collation of data.

Our main database contains 60,000 children's responses and access to these is provided via the website. The database is suitably anonymised and we have a random data selector to access up to 200 records of raw data. Over 200 tables of summary data, graphs and spreadsheets are available. We are still steadily increasing the amount and extent of results available from the website and have provided a number of schools with specific data they have requested for data handling projects within their school. The translation of the project into classroom activities is perhaps the most useful and important part of the whole project.

CLASSROOM

Many children in the UK think of statistics as a 'boring' part of mathematics that involves putting figures into tally tables and then drawing countless graphs. They see little relevance to themselves and certainly have no inkling of the key role statistics has in government and, indeed other, decision taking. Examples commonly used within schools to teach data handling and statistics include such mundane topics such as test scores in various subjects, weights of tomatoes and memberships of book clubs. These topics are unlikely to either spark children's interest or set off any burning questions for them. The *CensusAtSchool* project, with its direct link into the adult census along with the personal nature of the information that is collected about their peers, gives

children information about topics they are more likely to be interested in and means they can relate the data they are handling to other dimensions of their life. Rather than just arguing that Manchester United is more popular than Liverpool they can back it up with statistics and see how this impacts on the discussion. They can investigate and come up with points relating to how the data was collected, the sample used, etc so utilising the power of statistics, but in a way that fits into their world. Integrating the project into teaching and learning activities in the classroom is a natural progression from collecting and collating the data.

We tried to do this integration in a number of ways. Firstly a series of curriculum tasks were developed in the form of worksheets (see Figure 2). These covered a wide range of subjects from Geography to Science and ICT to History. Both the content of the sheets and the way they are offered to schools was and continues to be important. They are all available from the website in two different formats. PDF (Portable Web Format) is designed to be attractive and eye catching while having small file sizes to enable easy downloads while Word format gives the teacher a document that can be easily altered or adapted to suit the teachers' particular needs. They may not like a certain question, or may wish to replace

Figure 2. Example Web Page of Curriculum Tasks

the data within the sheet with data relating directly to their pupils. In providing resources for the classroom we want to suggest ideas and widen the range of activities available for data handling but do not want to restrict teachers in any way. A number of the worksheets contain web links and it is also possible to use the sheets online, so encouraging greater use of the Internet within lessons but with a definite focus.

All of the tables of summary data available on the website can be copied and pasted easily into any of the commonly used word processors. The spreadsheets of data are larger and provide a source of raw data for investigation or more complex projects. We also developed a random data selector that allows access to a random selection of samples from the actual database (with all possible personal identifiers remove, of course). You select either from all the data or a specific region of the UK, give an e-mail address and the data is sent as a CSV file. The returned data requires careful thought as it contains an amalgamation of the two different questionnaires. Data coding explanation sheets are available for download and, after some effort is put in to interpret the variables in the CSV file, a rich source of data can be utilised. This again is a part of statistics very under represented in school textbooks. As Moore (1997) says '*Data, like words, speak clearly only when they are organised…We use data, like words, to communicate facts and to support conclusions… Like words, data must be well organised if they are to communicate clearly'.*

Some of the worksheets that are most useful to schools in the UK are those that provoke discussion and create a need for pupils to make decisions themselves. A colleague from St Julie's High School in Liverpool was very impressed at how the 'Data with no name' worksheet elicited her usually unresponsive 15 year olds to recall a wealth of statistical techniques to apply to the data supplied when given a very open ended task. The Victorian *CensusAtSchool* task sheet, along with the Queen Victoria one led to many positive comments from primary teachers who noted how it fitted into the National Curriculum topic on Victorians, while also opening up the topic of carrying out a census.

INTERNATIONALISATION

We quickly became aware that *CensusAtSchool* did not just have meaning and context in the UK. Since, following the United Nations edict of September 1995 calling on all member countries to compile census data by 2004, many countries were engaging in adult censuses. Contact was established with a wide variety of countries including Canada, South Africa, Norway, Queensland, New Zealand and Italy, who without exception saw the appeal of the *CensusAtSchool* project and its potential, both in terms of enlivening data handling activities in their classrooms, but also by encouraging children to understand more fully the purposes and processes of carrying out a census. The Office of Economic and Statistical Research (OESR) at the Queensland Treasury, along with the School of Mathematical Sciences at Queensland University of Technology, ran the project in May 2001, setting up a sister web site similar to ours as the focus of the project there. They also ran a school poster competition in conjunction with the project and now have a large database of approximately 15,000 responses from children across the length and breath of the state. They also used two slightly different questionnaires using the majority of identical questions, along with others asking which jobs were regularly done at home and television access.

Statistics South Africa showed great interest in the project and decided that in the light of the dramatic changes in their recent history along with the introduction of statistics into their new Curriculum 2005, that *CensusAtSchool* should become a project that ALL South African schools should participate in. Using Statistics South Africa's infrastructure set up for the adult census in October 2001 they decided to implement the project across the country. Like Queensland, they set up a sister web site to host the project. However owing to the lack of technology in the vast majority of state-run schools the technological approach was aimed mainly at encouraging private schools to also participate. The vast majority of schools who took part in the project had to use paper-based methods with census enumerators delivering the materials to school. OCR readers were used to read the returned census forms. This has all meant that we are well advanced in our plans to create a worldwide database which teachers and learners will be able to both contribute to, and use, in order to enhance teaching and learning within the classroom.

CONCLUSION

In the UK we have designed and implemented a smaller follow-up *CensusAtSchool* project entitled 'Phase Two'. This was run from Oct 2001 to January 2002. A single questionnaire is being used with just twelve questions. These questions link together the international variations of phase one of *CensusAtSchool* with questions taken from the original UK, Queensland, South African, Italian and Norwegian versions. We have developed a web form so that children can enter their data directly into a computer in their school and it is sent electronically directly to our database. Some schools have taken this opportunity to teach children about the different methods of data entry. For example a teacher in Northern Ireland had half of his class fill in the web form and the other half fill in the paper version of the questionnaire and then transfer the results onto spreadsheets and email then back to us. This led to much discussion and learning, enhanced by the personal involvement of the children themselves.

The random data selector is being extended so that everyone can sample each country's data and a worksheet creator, capable of generating individual unique worksheets from randomly selected data for whole classes, is currently being developed. A teacher-training course, which is *CensusAtSchool* data-driven has been created and successfully piloted in Wales. This aims to enhance the professional development of teachers, using the data to bring life to both ICT and data handling methods and encourages teachers to create their own resources using real data. The possibilities of further initiatives stemming from *CensusAtSchool* are very promising indeed. The message must be: *real data gives real learning.*

REFERENCES

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