Canada at a Glance: Integrating facts about Canada with data management to support elementary curriculum

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As a former elementary teacher and a present teacher educator, I have often been puzzled by how some elementary teachers address the data management component of their math programs. Data management, of course, focuses on displaying, analysing and interpreting numerical data and traditionally, this is one of the math strands that is least effectively taught in the elementary grades. More often than not, data management at this level is reduced to teachers surveying their students about favourite bubble gum flavours or favourite television shows and then graphing the results after tabulating the data. While this student-centered approach can certainly be called data management, I believe that it is relatively simplistic and underestimates what many upper elementary students are able to do.

At the same time this has been happening, teachers, parents, and academics alike have decried what they have seen as the appalling lack of knowledge that elementary students have of their own country. Given the inadequate teaching of data management skills and the minimal knowledge that elementary students seem to have of Canada, I have often wondered why more elementary teachers have not used real data on real Canadians. The answer, I think, is due to the fact that most Canadian teachers, particularly at the elementary level, do not even realize that Statistics Canada resources exist; therefore, they miss an excellent opportunity to integrate subject areas like Math and Social Studies. This article explains how I have used one Statistics Canada resource with my own Grade 6 students and more recently, with the students in my daughter's Grade 5 class.

Context

I don't remember when or how I stumbled across Statistics Canada resources but it might have been a serendipitous meeting with a StatCan employee at the 1997 meeting of the Canadian Society for the Study of Education held at Memorial University in St. John's, Newfoundland. At that time, participants of a workshop were introduced to the wide range of Statistics Canada resources such as the E-STAT database and the Canadian Social Trends magazine. However, it was the pocket-sized *Canada at a Glance* that caught my eye as a Grade 6 teacher. For those who haven't seen this relatively small, free print booklet, it is chock full of interesting statistics about Canada in an easy-to-read, accessible format. There are tables on Education, Health, Justice, the Economy and Foreign Trade but it is the very first section called "Demographics" that I felt had the most potential in my work with elementary school-aged students. This section includes statistics on the population of the provinces/territories, major urban areas, population by age group, mother tongue, aboriginal identity, immigrant arrivals, urban versus rural population, and immigrant population. The rest of this article explains how I have used this resource to integrate my teaching of data management skills with Social Studies and Education Technology. It will also discuss some of the benefits and challenges of teaching in this way. Hopefully in the process, it will provide teacher librarians with ways to encourage the publication's further use in the future.

Procedures

When I have used *Canada at a Glance*, I have made sure that my students had a working knowledge of what data management was and how different graphs could be used to display different kinds of data. In other words, I discussed with them how pie or circle graphs could be used to show percentages or proportion while line or bar graphs could be used to show change over time.

After I completed this preliminary phase, I ordered free individual student copies of *Canada at a Glance* from Statistics Canada. This can be done online at http://www.statcan.gc.ca/kits-trousses/edu01i_0000-eng.htm.

When the class copies arrived at the school, I walked my students through the booklet, I discussed its purpose and its organization, and then I interpreted the tables that I felt were appropriate for my particular students. (Some tables in *Canada at a Glance*, such as the ones on the Economy and Labour Markets are probably too complex for elementary students but they could certainly be used at the secondary level).

Once my students were familiar with the booklet and I was convinced that most of them understood what the data were saying, I then took them to the computer lab. It was here that I explained that we could use a spreadsheet program like Microsoft Excel to graphically display the data from selected tables. Of course, we first had to import or enter the data before we could use the graphing option and this had to be done in a specific way. As most elementary teachers and teacher librarians can attest, very few students at this level have any experience working with spreadsheets so some time needs to be spent explaining how to enter and organize the data. I typically walk my students through the first table on page 2 entitled, "Population, Canada and provinces/territories." Particularly at the elementary level, students need a model to follow before they will feel prepared to do the same thing independently.

I then show them how to highlight the data they have entered on their spreadsheets and select an appropriate graphing option. For instance, bar graphs might be suitable for displaying the population of the provinces/territories.

I would suggest that teachers and/or teacher librarians remind their students to label their axes and to remember to give each of their graphs a title. Using this basic procedure, upper elementary teachers can easily choose 8 -10 tables from *Canada at a Glance*, interpret them along with their students, discuss which graphs would be appropriate for displaying the selected data and then ask the students to prepare a series of graphs. When I have followed this procedure, I have also included a question sheet or contract for students to work through as they are entering the data and producing the appropriate graphs. In this manner, students can manage data, think seriously about how to best display that data graphically, and then show their teachers that they know what the graphs are saying by answering questions in the contract. Working through the assignment in this way with students producing between 8 to 10 graphs could easily take a week or two, depending on the level of students, how much time per day is devoted to the unit, the number of graphs to be completed, and the availability of computer lab time etc. In the end, however, students will have been taught how to manage data on real Canadians and how to use computers to display data in graphical form.

Challenges:

The kind of unit that I have outlined certainly doesn't come without its challenges. One of these challenges is the diversity of ability that you will find in any class. As I have suggested, some students will be introduced to the data and how to use Excel and will be able to work quite independently. This is

particularly true of students with a strong number sense and students who enjoy the problem-solving aspect of computer work. On the other hand, there will likely be students who are not as Math oriented, who have few opportunities to work on computers, and who aren't intuitive problem solvers. Given this possibility, I would recommend that teachers differentiate their expectations so that lower-achieving students do not get too frustrated.

A second challenge that teachers may face is a lack of computer time. Being able to reserve computer lab time for the number of classes required may be problematic in some schools. If this is the case, some students who have computers at home may decide to import or enter their data and produce their graphs at home. This will free up available computers for those students who don't have their own machines.

A third challenge is the need to troubleshoot while students are working on their graphs. Students at this age do not necessarily enter their data accurately, double check their work, or know what to do when they produce a graph that doesn't reflect their data. In other words, as with many other computer-based activities, teachers need to be able to circulate and troubleshoot as problems develop. The more familiar they are with the hardware and software, the more effective they will be.

Conclusion:

The purpose of this brief article has been to describe how I have used *Canada at a Glance* with elementary students as a way of integrating Math, Social Studies and educational technology. I have observed that students at this level can learn more about their own country and are genuinely interested in it. I have also observed that students at this level can understand the kind of data found in *Canada at a Glance* which suggests to me that perhaps teachers do not need to fabricate data as often as they do. Finally, I have observed that *Canada at a Glance* offers elementary teachers a unique opportunity to teach across subject areas and teacher librarians an exciting way to assist their classroom colleagues!

Please note:

Statistics Canada offers lesson plans on its website that uses *Canada at a Glance* to help students acquire data analysis and graphing skills. In these lessons, which can be used without computers, students examine the booklet and select data of their choice to prepare graphs, write descriptions of trends and make predictions. The *Canada at a Glance* lesson plan for intermediate students is at http://www.statcan.gc.ca/kits-trousses/edu04_0019-eng.htm. For secondary students the lesson is at http://www.statcan.gc.ca/kits-trousses/quality-qualite/edu04_0016-eng.htm.

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