

UNECE Work Session on Statistical Dissemination and Communication
(12 - 14 September 2006, Washington D.C., United States of America)

PROVISIONAL AGENDA AND TIMETABLE

The meeting will start on Tuesday, 12 September 2006 at 9:30 a.m. at the International Monetary Fund (IMF),
HQ2 Building, 1900 Pennsylvania Avenue, Washington, DC, United States of America

Tuesday 12 September		
Time	Agenda Item	Documentation
9:00	Registration and coffee	
9:30	Welcome and opening of the meeting	WP.1
Topic (i): Communicating effectively on the Web Session Organisers: Colleen Blessing, United States Energy Information Administration Laurie Brown, United States Social Security Administration		
10:00	Introduction to the topic by Session Organisers	
10:05	DESIGN EXPERIENCES	
	Usability Wendy Yee (UserCentric Inc.)	WP.2
11:05	Coffee break	
11:25	Using Paper Prototypes to Test Website Navigation Nicholas Johnson and Adrie Custer (US Department of Agriculture)	WP.3
	Moving into the 21st Century: the IMF's Transition to New Environment for the Web Dissemination of its Statistical Databases Cathy Wright (International Monetary Fund)	WP.4
	Standing Out in a Crowd: Improving Customer Utility on a Centrally Administered, Shared Web Site Barry Johnson (US Internal Revenue Service)	WP.5
12:10	WEB TAPAS	
	Blind Friendly Web Helena Kolácková (Czech Statistical Office)	WP.6
	FedStats' Work on Accessibility Marianne Zawitz (US Bureau of Justice Statistics) and Laurie Brown (US Social Security Administration)	WP.7
12:40	Lunch break	
14:10	Perception, Process, Performance: What We Need to Know to Improve the Quality and Usefulness of Our Web Writing Thom Haller (Executive Director, Center for Plain Language)	WP.8
15:10	Blogs - are there business applications for statistical agencies? Jessica Gardner (UNECE)	WP.9
15:40	Coffee break	
16:00	Three years of 'intelligent graphics' Doris Stärk (Germany Federal Statistics Office)	WP.10
Rich Internet Applications (paper only) - Laurie Brown (US Social Security Administration)		WP.11

Tuesday 12 September		
Time	Agenda Item	Documentation
16:15	SUCCESS STORIES	
	Chez INE (our way for ‘serving’ and ‘presenting’ data) Fernando Villa (Spain INE)	WP.12
16:30	General Discussion, summary and conclusions	
17:15	Close Day 1	

Wednesday 13 September		
Topic (ii): Statistical literacy: Is what we have here a failure to communicate? Session Organisers: Rick Devens, United States Bureau of Labor Statistics Colleen Flannery, United States Census Bureau		
Time	Agenda Item	Documentation
8:30	Coffee	
9:00	Introduction to the topic by Session Organisers	
9:10	Interrelation with Users and Policy on Dissemination of Information Meri Amirova and Nemat Khuduzade (State Statistical Committee of the Republic of Azerbaijan)	WP.31
	The Dimensions of Statistical Literacy: conceptual and practical evaluations Jussi Melkas (Statistics Finland)	WP.13
	Communication and Perception: which world do statistics live in? Sibylle von Oppeln-Bronikowski (German Federal Statistics Office)	WP.14
10:10	General discussion	
10:40	Coffee break	
11:00	Panel: Bringing Numbers to Print Paul Overberg (USA Today) John Berry (Bloomberg) and Ken Meyer (US Census Bureau)	
12:20	News releases published on special occasions Ida Reprovz-Grabnar (Statistical Office of the Republic of Slovenia)	WP.16
12:40	General discussion	
13:00	Lunch break	
14:30	Taking a horse to water.... and giving it a bottle David Marder (Office for National Statistics, United Kingdom)	WP.17
	Top 10 Statistical Writers’ Blocks Rick Devens (US Bureau of Labor Statistics)	WP.18
	Developing Statistical Literacy in the case of Macedonia (paper only) Mira Todorova (State Statistical Office of the Republic of Macedonia)	WP.15
15:20	General discussion	
15:40	Coffee break	
16:00	Discussion, summary and conclusions	
17:00	Close Day 2	

Thursday 14 September		
Topic (iii): How to present metadata		
Session Organiser: Vicki Crompton (Statistics Canada)		
Time	Agenda Item	Documentation
8:30	Coffee	
9:00	Introduction to the topic by Session Organiser	
9:05	Understanding the role of metadata in finding and using statistical information Carol Hert (University of Washington)	WP. 19
	Research-based metadata requirements for a BLS reports archive Scott C. Berridge, John J. Bosley, and Daniel W. Gillman (US Bureau of Labor Statistics)	WP. 23
	Publishing Metadata with Data - XML based dissemination process of statistical information (COSSI) Harri Lehtinen (Statistics Finland)	WP. 25
	Creating a User-Friendly Glossary and Other Metadata Makeovers Melinda Hobbs (US Energy Information Administration)	WP. 24
	Metadata and dissemination of microdata to researchers - examples from a webpage under construction at Statistics Norway (Presentation only) Fride Eeg-Henriksen (Statistics Norway)	WP. 21
	Presentation of descriptive metadata on the ABS website Mano Georgopoulos (Australian Bureau of Statistics)	WP. 22
	Keeping www.statcan.ca visitors in the metadata loop Louis Boucher (Statistics Canada)	WP. 20
	Metadata on the Statistical Portal for the Border Region of Saarland – Lorraine – Luxembourg – Rhineland-Palatinate – Wallonia (paper only) Guy Zacharias (STATEC Luxembourg)	WP. 32
10:50	General discussion, summary and conclusions	
11:20	Coffee break	
Topic (iv): Managing revisions and version control to maintain credibility		
Session Organiser: David Marder (Office for National Statistics, United Kingdom)		
11:40	Introduction to the topic by Session Organiser	
11:50	How to Use Mistakes to Improve Credibility Leon Østergaard (Statistics Denmark)	WP.26
	Corrections to Publications at Statistics Sweden Anna Östergren (Statistics Sweden)	WP.27
	Informing the User about corrections: the policy of Statistics Netherlands Huib Van de Stadt (Statistics Netherlands)	WP.28
12:50	Lunch break	
14:10	Fixing mistakes on the Internet: a case history at Statistics Canada John Flanders (Statistics Canada)	WP.29
	Presenting updates and revisions of statistics to a sceptical audience David Marder (Office for National Statistics, United Kingdom)	WP.30
15:00	General discussion, summary and conclusions	
15:20	Coffee break	
15:40	Discussion on future work	
16:10	Adoption of the report, closing of the meeting	Draft report
16:40	End of Meeting	

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ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS**

UNECE Work Session on Statistical Dissemination and Communication
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Topic (i) Communicating effectively on the Web

USING PAPER PROTOTYPES TO TEST WEBSITE NAVIGATION

Supporting Paper

Submitted by The Economic Research Service, U.S. Department of Agriculture, United States of America¹

I. INTRODUCTION

1. How do we help website visitors find what they are looking for? This is one of the most common and important questions for web managers and designers today. It is a persistent challenge to lead users to the content they need on the Economic Research Service (ERS) agency website. ERS has worked for years to improve the ability of visitors to find what they seek in the vast collection of agricultural economics information. These efforts have resulted in measurable success. This paper describes the process ERS used to test whether a new navigation scheme would help visitors find content on the website.

A. The ERS website redesign

2. ERS has known since 2002 that users of the website experience difficulty finding information. This is indicated clearly by user surveys, interviews, and testing. In 2003, when the United States Department of Agriculture (USDA) mandated that all of the Department's websites conform to a common look and feel, ERS decided to combine the redesign with improvement of its website's organization. ERS took a new, faceted approach to organizing content, using a hierarchical taxonomy of subjects, and two other facets—commodity and geography—which would all be available from a navigation menu. Defining this organization and structure of content took two years of content analysis and stakeholder consultations. Along the way, we tested the new organization independent of the website design. This test revealed that the organization of content itself was understandable, but it could not confirm that website visitors also would be able to navigate to what they seek. Any link on a page may be selected as the next target; thus testing the navigation menu alone does not necessarily reflect how users will really seek content on the website.

3. To test how users would actually seek content, the navigation menu would need to be tested in the context of the new website design. Unfortunately, because a website's organizational structure is tightly integrated into the entire website, there are more trade-offs than usual involved in the decision of when to test a new navigation scheme. The sooner a design is tested for usability, the less expensive it is to make changes. However, to thoroughly test the ease of navigating a website, the website must have a substantial portion of the pages built so it provides a realistic navigation scenario. This is the challenge we faced: How do we quickly build a realistic prototype to test website navigation effectively?

¹ Prepared by Nicholas Johnson (njohnson@ers.usda.gov) and Adrie Custer (acuster@ers.usda.gov).

II. BACKGROUND

B. Formative usability analysis methods

4. *Formative analysis* is usability analysis of a system conducted before the system is complete. It informs the design process, as opposed to *summative analysis*, which evaluates the outcomes of a system once complete. Making design changes based on usability findings from formative analysis is much less expensive than from summative analysis, because it is easier to change a website before than after it is built. Therefore, formative usability analysis is considered the most cost-effective way to improve the usability of a website.

5. There are several popular methods of formative usability analysis, which all use some kind of website prototype. A complete discussion of these methods is beyond the scope of this paper, but Usability Net has a good listing of methods at: <http://www.usabilitynet.org/tools/methods.htm>. *Usability testing* (sometimes called *performance testing* or *user testing*) is generally considered to be the most valid way of testing a website, because participants attempt to perform real tasks using the actual website or a working prototype. As with usability testing, the objective of our analysis was to dissect a scenario of navigating the website that is representative of real usage. However, because a working prototype could not be produced, performance testing was not possible. The solution we adopted was the formative analysis method of *evaluate prototyping*,² which we used to probe the most important cognitive processes of navigating through a website.

C. Evaluate prototyping

6. The evaluate prototyping method is an infrequently utilized formative usability analysis method that involves users in the early stages of development. A paper or machine prototype is used, and the emphasis is on probing the participants to explain their expectations and indicate any confusion. In our case, we tailored the method to reveal information about whether, during actual usage, the participants would be able to navigate the website in order to complete tasks. The study administrator asked specific questions targeted for this purpose.

III. METHODS

D. Prototypes

7. Prototypes include some details while omitting others. Since we were interested in testing the navigability of the website, our choice of details to include in the prototype was informed by our educated assumptions about navigational behavior. We chose to use a design prototype that included only a few fully designed pages. We believe the omission of the breadth of pages was worth the inclusion of the complete design details of a few pages, because any design element may affect how users navigate from a given page.

8. The pages we included in the test were the homepage and four “*navigational landing*” pages. These pages were included in the test, because we expect them to be the most common places where users will start navigating the new ERS website. Each navigational landing page is a summary listing of content on the ERS website related to a given category (see Figure 1). These included the Agricultural Economy and Commodity Outlook subject landing pages plus the Wheat and Alabama pages.

9. For each page we intended to test, we made two copies of its prototype, which we printed on paper: a “clean” copy and a “marked” copy (see Figures 2 and 3). The clean copy appeared as the page would on a web browser. The marked copy was identical to the clean copy, except for red circles at several locations where we would ask participants: “What will happen when you click here?”

² Usability Net. *Evaluate Prototype*. <http://www.usabilitynet.org/tools/evaluate.htm>



Figure 1: Navigational landing page.



Figure 2: Clean copy of the homepage prototype



Figure 3: Marked copy of the homepage prototype.

E. Test protocol

10. After informing participants of their rights in the usability study (e.g., that they may quit and leave at any time), we asked them six questions for each page tested. The questions took about 20 minutes per page. Following are the questions and the order in which they were asked.

- a. What is your first reaction to this page?
- b. Where would you click to find...
 - i. an expert on wheat?
 - ii. data on how much rice Alabama produces?
 - iii. the commodity outlook reports?
 - iv. information on market structure and market concentration?
- c. What do you think is the objective of this page?
- d. Where are all the places on the page that you can click?
- e. What will happen when you click here...? (pointing to each red dot marked on the marked copy of the paper prototype).
- f. What on this page is confusing?

Question b was asked only on the homepage, because that is generally where users start their search for information. Question e was asked several times per page, once for each red circle on the marked copy of the prototype. Although only question b simulates the act of finding content, the other questions are also relevant to navigation, because when navigating a website, people must evaluate each page and make predictions about the next page³. At the end of the test, participants were also asked for their recommendations and for any general points of confusion across all the pages that were tested.

F. Participants

11. In December 2005, five participants were recruited from among permanent staff at ERS who represent potential users of the ERS website. Four participants were agricultural economists and one was a research editor. Although the test used a relatively small sample, it revealed several insightful findings about the website, its navigation system, and the test protocol.

IV. RESULTS

12. We obtained five useful results from our evaluation. The first finding was simply that all participants liked the design and structure of the website and its navigation. When we asked for participants' initial reactions to each page, they generally indicated that the site appeared more organized and professional than the previous ERS website. Additional findings related to navigation, interpretations of the homepage, usage of introduction paragraphs, and expectations of how an interactive menu would function.

13. Whether participants would be able to use the new organization to find content was analyzed with the question "Where would you click to find..." During this part of the study, we observed participant behavior and measured the success rates of participants. If the participant selected a link that would lead to the right content, it was considered a success. If he chose a link that did not bring him any closer to the content, it was considered a failure. The participants' navigation success rates were generally very high, except for the question about finding information on market structure and market concentration (see Table 1). These findings suggest that participants generally understood the website's navigation structure and how to move from the homepage toward completion of the four tasks tested. However, the labels used in the "Browse by Subject" list needed further improvement. Due to imprecise labelling, only one participant knew that market structure and concentration information was available by

³ Furnas, G.W. *Effective View Navigation*. In Proceedings of CHI'97, pp. 367-374, ACM Press, 1997.

clicking the “Food & Ag Industries” link. This task also revealed that the majority of participants were confused by the “Agricultural Economy” subject. They reported that it was too broad and imprecise, because in fact the entire ERS website relates to agricultural economy.

Table 1: Navigation Success Rates

Where would you click to find...	Number of successful participants
1. An expert on wheat	5
2. Data on how much rice Alabama produces	5
3. The commodity outlook reports	4
4. Information on market structure and market concentration	1

14. It is well known that website visitors tend to avoid reading blocks of text, so we expected the introduction paragraphs on the navigational landing pages largely to be ignored or overlooked. However, all participants read the paragraphs to help them understand the meaning of the subjects. Unfortunately, these paragraphs were not finalized at the time of the study and did not accurately explain the Agricultural Economy and Commodity Outlook subjects. All participants raised this as a point of confusion, which highlighted the importance of these introduction paragraphs to navigating the ERS website.

15. Among the initial reactions was that almost all participants viewed the one large feature graphic in the center of the page as encompassing ERS’s available content. The feature graphic incorrectly communicated the idea that ERS has a very narrow scope of content. One participant summarized this well: he thought the objective of the homepage was “to deliver information on conservation and compliance.” This clearly indicated a failure to communicate to visitors the broad scope of content they can access from the ERS homepage.

16. Participants’ expectations of website functionality were generally correct, except in the case of the commodity and geography dropdown menus. Below the “Browse by Subject” section of the navigation menu are two dropdown menus that allow users to get information related either to a commodity or a geographic location of interest (see Figure 4). When asked “What do you think will happen when you click on this dropdown menu?” several participants responded that they thought it would allow them to find information related to a specific commodity *and* geographical region. For example, they thought they could get information on wheat in Russia if they selected both. In reality, the dropdowns function independently, not in concert. This indicated a failure to communicate how the dropdown menus actually functioned.

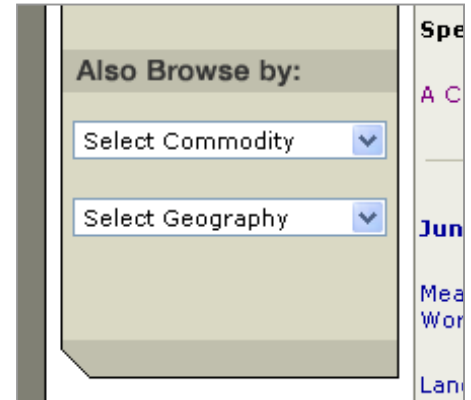


Figure 4: Browse by commodity and geography dropdowns.

V. DISCUSSION

17. Although the sample of participants and the number of prototype web pages were small, we were able to elicit some valuable findings about the navigability of our new website using the method of evaluate prototyping. We learned that overall, the navigation design and interaction were easy for participants to use, but that some elements needed improvement before users could navigate the website successfully. Areas for improvement included: ensuring the subject introduction paragraphs were accurate and concise, revising the homepage so it does not convey a restrictive scope of ERS content, and editing some subject labels in the navigation menu.

18. The evaluate prototyping method provided useful results about website navigability and involved real users sooner in the development lifecycle than other more popular methods. However, there are some disadvantages to the approach. Some pros and cons are:

- Pro: Because a prototype is used, it can be performed early in the development lifecycle.
- Pro: Analysis can be done at the page level, so it does not require the entire website to be developed or designed.
- Pro: Involving users yields more valid, real-world results than methods that do not, such as heuristic reviews and cognitive walkthroughs.
- Pro: It is easy to collect rich qualitative information including opinions, perceptions, and expectations.
- Con: The results are not as realistic as if a user test were performed with a working prototype of the entire website.
- Con: Few quantitative performance measures can be collected. For example, measuring the time spent on each task is better measured with a working prototype and a performance-based usability test.
- Con: Because there is significant prompting on the part of the study administrator, the risk of giving unintentional clues about the website is higher than with other methods.

19. Evaluate prototyping is a useful tool for designers to perform formative usability evaluation on navigational structures for websites. It is a method that is best used as a substitute for performance testing when performance testing is impractical due to the development timeline. We anticipate using evaluate prototyping on other website projects to get early results on the usability of website organization and structure.

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Topic (i) Communicating effectively on the Web

**MOVING INTO THE 21ST CENTURY:
THE IMF'S TRANSITION TO NEW ENVIRONMENT FOR THE
WEB DISSEMINATION OF ITS STATISTICAL DATABASES**

Submitted by the International Monetary Fund¹

I. INTRODUCTION

1. This paper discusses the experience of the International Monetary Fund's Statistics Department as it attempts to move, somewhat belatedly, from a focus on the preparation and dissemination of print publications to a focus on the release of its statistics via a web-based, on-line environment. Important lessons have been learned from consulting studies and from reviews of the web sites of other statistical organizations. With the benefit of the consulting studies and collaboration among several IMF departments progress in being made. Much work remains to be undertaken but the foundation is now firmly in place.

¹ Prepared by Cathy M. Wright, Advisor, Statistics Department (cwright@imf.org).

II. THE CURRENT SITUATION

2. The IMF's Statistics Department (STA) disseminates a considerable number of databases offering a broad range of economic and financial information. Some databases are released via multiple forms of media—print publications, CD-ROMs, online—and some are released only on the IMF's web site (<http://www.imf.org>). Other statistical information such as manuals and guides, methodological information, newsletters, etc. are also available on the IMF's web site. In addition extensive country-specific metadata is released via the Data Dissemination Standards Bulletin Board (<http://dsbb.imf.org>) under the Special Data Dissemination Standard (SDDS) and the General Data Dissemination System (GDDS).

IMF Data and Metadata Products

- **“Traditional” products in print and on CD-ROM**
 - Balance of Payments Statistics (BOPS)
 - Direction of Trade Statistics (DOTS)
 - Government Finance Statistics (GFS)
 - International Financial Statistics (IFS)
- **Online products, different formats**
 - International Financial Statistics (modeled after the CD-ROM)
 - International Reserves (static tables)
 - Coordinated Portfolio Investment Statistics (static tables)
- **IMF Data Dissemination Standards Bulletin Board**
 - Special Data Dissemination Standard
 - General Data Dissemination System

3. Released over a period of many years, each offering is presented in the format that was deemed appropriate at the time. The users of today are confronted with a rich but confusing collection of statistical material widely dispersed across the IMF's web site or available only in print or on CD-ROM. It has become painfully clear that the result is a compilation of material difficult to access, not terribly coherent, and lacking in an holistic view of statistical data and its supporting information.

III. FIRST STEPS TOWARD CHANGE

4. The Statistics Department in collaboration with the IMF's External Relations Department (EXR) determined that the first step would be to learn more about the perceived shortcomings of the existing data arrangements. In spring 2005, two studies were commissioned: the first conducted qualitative usership research² on STA's four major products (IFS, DOTS, BOPS, GFS) and the second reviewed best practices for web dissemination across a large number of national statistical offices, international organizations, and private business.³

5. The findings of the usership research were disquieting but provided a realistic assessment of the strengths and weaknesses of the databases and their modes of access. Not surprisingly, within the Statistics Department the prevailing view was that we were providing important products of high quality

² Conducted by David Oser, Research Perspectives, London, UK.

³ Conducted by Angus Robertson & Lou Ann Sabatier, Sabatier Consulting, Falls Church, VA & New York, NY.

and that while some updating of our products was needed that what we were doing and how we were doing it were fine. The usership review revealed that while our clients placed great stock in the IMF imprimatur and highly valued the extensive country coverage and comparability of our data, the products themselves were flawed by a lack of timeliness, poor metadata and other supporting documentation, confusion about the coding structure, and dissatisfaction with the responsiveness to data problems and queries regarding the data. Being confronted with this reality took many by surprise. It has, however, created a commitment to change. The studies sent a clear message that a significant effort is needed in order to move towards electronic dissemination of data as rapidly as possible and to redesign the interface to the data and metadata in all forms of media.

6. With the results of the best practices review, STA and EXR are moving towards creating the foundations for a fresh, web-based environment that will facilitate searching for and access to all statistical databases. It is a daunting task but one that must be undertaken if the IMF wishes to remain a key player in the provision of statistical data and metadata to the world community.

7. The following key recommendations from the two studies are currently in the process of being implemented:

- Develop and offer all IMF data products online
- Focus on timeliness and accuracy
 - Maximize the quality, consistency, and timeliness of IMF statistical data.
- Improve accessibility and ease of use
 - Make statistical data more visible and accessible on IMF website.
 - Provide references from the IMF website to all partner offerings of IMF databases.
- Expand availability of metadata
 - Ensure all online statistics are linked to relevant metadata.
 - Offer information on series descriptions, footnotes, economic topics, definitions of terms, sources, series codes.
- Broaden and deepen user support
 - Use RSS feeds to alert users to data updates and new reports.
 - Expand online help, including context sensitive guidance, FAQs and examples.
 - Establish means for updating and expanding online help based on user feedback.
 - Consider charging users for extensive support or specialized data requests.

IV. IMPLEMENTING CHANGE

8. While the recommendations above provide the guideposts for renewal and renovation, many important decisions remain to be taken and acted upon in order for the IMF to realize its goals of not only disseminating its data but communicating to many groups of users about its data.

9. The challenges that remain:

- Designing the user interface. This will be perhaps the most important component of the entire effort. Rather than yet another entry in the beauty contest of web sites, the goal is create a simple and friendly environment that users will wish to return to and to subscribe to.

- Selecting of the tools that will deliver access to and retrieval of the data. Candidates for consideration include Beyond 20/20, PC-Axis, and a version of the Economic Data Warehouse currently being developed (see the attachment).
- Establishing an effective means of communicating with and supporting users against a backdrop of increasing resource constraints.
- Aligning this effort with the implementation of an economic data warehouse within the IMF.

10. Clearly much work remains to be done by many contributors. While I had hoped to be able to show more concrete examples of our future design, I hope that this paper will arouse a continued interest in the forthcoming developments at the IMF. Next year at this time I hope to be able to unveil the new IMF environment for the dissemination of statistical data.

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Topic (i) Communicating effectively on the Web

**STANDING OUT IN A CROWD: IMPROVING CUSTOMER UTILITY ON A
CENTRALLY ADMINISTERED, SHARED WEB SITE**

Supporting Paper

Submitted by Statistics of Income, Internal Revenue Service, United States of America¹

I. INTRODUCTION

1. The Internet has become the primary public interface for many statistical organizations, offering opportunities to reach larger audiences with more products than ever before. Often, however, a statistical organization's virtual existence must be shared with other, dissimilar organizations, due either to resource constraints or policy decisions. In countries without a centralized statistical agency, such as the United States (U.S.), statistical organizations are often housed within much larger agencies whose missions are primarily administrative. In such cases, the needs of the statistical function are often at odds with those of the administrative function. Similar tensions can exist in countries where the statistical functions are centralized. In these cases, subject matter with a relatively small customer base may compete for visibility and resources with topics that have broader appeal. Shared use of a single Web site may reduce flexibility in design and limit the types of products that can be offered. Often, design decisions are driven by the component with the largest customer base and may not optimally serve smaller statistical functions and their customers.

2. Statistics of Income (SOI), a division of the U.S. Internal Revenue Service (IRS) and the primary source of data on the U.S. tax system, provides an excellent case study for this sort of coexistence. The irs.gov Web site is designed primarily to assist taxpayers in filing their taxes. It contains tax forms, filing instructions, regulatory rulings and other resources for answering questions about the myriad tax and information reporting requirements that compose the U.S. tax system. It is also home to SOI's Web pages, "Tax Stats," which provide public access to more than 4,000 statistical data products and average almost 500,000 downloads per month. This paper will focus on SOI's efforts to improve the Tax Stats pages on irs.gov. It will discuss recent redesign efforts and share future plans, all in the context of working within the design limits imposed by a multiuse Web site. The goal is to provide guidance and encouragement for other statistical organizations in similar situations.

II. BACKGROUND

3. The official public IRS Web site, irs.gov, is maintained by a contractor, under the supervision of two organizations within the Service. The Communications and Liaison division (C&L) oversees the general look and feel of the Web site and maintains a set of detailed guidelines for page design, including approved fonts, colours, page formats, writing style, etc. All Web pages and content posted to irs.gov must be created and modified through the Content Management Application (CMA). This tool, through validation checks and the use of dropdown menus, helps ensure that all Web pages comply with the parameters specified in these guidelines. The IRS Electronic Tax Administration division (ETA) oversees the hardware and software aspects of irs.gov. Jointly, these two divisions set standards, plan upgrades, conduct user-testing and facilitate monthly meetings with irs.gov's major content providers.

¹ Prepared by Barry W. Johnson, Barry.W.Johnson@irs.gov

4. Statistics of Income began disseminating data electronically in 1992 via an electronic bulletin board, which was maintained on a personal computer by SOI staff. In 1996, SOI replaced the bulletin board with the Tax Stats pages on irs.gov. These pages were organized by subject matter, primarily reflecting SOI's internal structure. Downloads and Web content grew annually, but, by 2003, it became clear that customers, particularly those new to Tax Stats, were having difficulty locating products and services. To learn more about customer experiences on Tax Stats and to address problems, SOI formed a small, cross-functional "Web team" made up of economists, statisticians and computer specialists from a diverse array of subject matter areas.

III. GATHERING FEEDBACK

5. Any organization with a Web presence needs to periodically measure how well it is serving its customer base. For SOI, informal feedback provided a catalyst for evaluating the effectiveness of SOI's Web pages. Initially, some of the most useful comments came from customers who contacted its Statistical Information Service (SIS) after failing to find the information they wanted on Tax Stats. Many times, SIS staff were able to help these customers navigate the Tax Stats pages to find the information they needed, a clear indication that the Web pages needed improvements. In addition, SOI has a panel of expert tax policy researchers who meet biannually to offer feedback and provide direction to SOI. These users not only provided additional, informal feedback about their experiences using Tax Stats, but also became an integral part of the redesign process.

6. To gather formal information from customers, SOI developed a survey that was given to all callers who contacted SOI's SIS staff.² This survey included 11 structured questions and an opportunity for general comments. Questions included general respondent information (occupation, frequency of visits to Tax Stats, subject matter interests), general satisfaction with Tax Stats (ease of use, quality of products, overall satisfaction) and suggestions for improvements (expanded content, preferred file formats, specific changes to improve navigation). In addition, the survey was administered to the membership of the U.S. National Tax Association, whose participants are considered key users of SOI data, and to SOI's consultants. The results showed that SOI customers had a wide range of occupations but were mainly researchers from universities; Federal, state or local government employees; or individuals providing consulting or issue advocacy services. In general, customers found SOI products useful and of high quality but often had difficulty locating items on Tax Stats. They specifically cited problems with Web page organization. Other comments included requests for more data, especially historic data, and easier-to-use product formats for data tables and articles.³

7. In addition to formal and informal customer feedback, irs.gov provided SOI with monthly Web metrics that identified popular products. These metrics were also useful as benchmarks against which redesigned pages could be evaluated. After analyzing data from all sources, it was clear that both page and overall Web site design issues were contributing to user dissatisfaction. Page design problems were generally things that SOI could address directly. Site design problems posed a greater challenge, since these necessitated working with irs.gov personnel to change the structure of irs.gov or modify style guidelines.

IV. ATTACKING THE PROBLEM

8. Having confirmed that customers were having difficulty finding information on the Tax Stats pages of irs.gov, the next step was to identify products that SOI wanted to make available to the public via the Web. This was done through conducting a careful inventory of existing Tax Stats content, brainstorming new product offerings and researching the types of products available from other statistical functions in the U.S. and internationally. Customer feedback from the surveys was also very important to this process. A few prime customers provided additional input by participating in a card sort exercise.

² While an online survey of Tax Stats users would have been preferred, at the time of the redesign, irs.gov did not have the technical capacity to implement Web surveys.

³ Prior to the redesign, documents were available in PDF, Lotus and Microsoft EXCEL. In addition, larger files were compressed and provided as executable files.

9. Card sorting, as applied to information management, is a technique for developing an information structure, as well as suggesting navigation, menus and possible taxonomies.⁴ SOI used its panel of 15 consultants as subjects for this exercise, which was conducted via mail.⁵ Each test subject received a package consisting of: 1) slips of paper, each with a single content item printed on it, 2) instructions and 3) some blank slips of paper for subjects to write in additional content items. Participants were asked to create subgroups from items they perceived as related, by grouping individual cards using rubber bands and paper clips, and then to organize these subgroups into larger categories. Participants then mailed the cards back to SOI, along with any comments or suggestions they wished to add. While response rates were somewhat disappointing, the six subjects who chose to participate represented a range of research interests. Despite their varied interests, the subjects provided results that were surprisingly similar. Each also provided a number of suggestions for new content items. The results of this exercise were instrumental in developing the structure and content of a prototype for the new Tax Stats Web pages.

10. Another important component of the redesign effort involved examining Web sites of major U.S. and international statistical agencies, as well as a number of commercial Web sites. The team also reviewed articles and research papers that presented guidelines for effective Web pages.⁶ At the time, the recently redesigned U.S. Bureau of Labor Statistics (BLS) Web site was particularly helpful, because it is an organization whose mission and scope are similar to those of SOI. As BLS is renowned for its cognitive research, all its new Web pages were subject to extensive usability tests, the results of which are well documented in a series of papers on Web design and testing.⁷ In addition, the BLS Web designers were very generous in sharing their expertise with SOI's Web team.

V. DEVELOPING A PLAN

11. The official irs.gov design guidelines provided three basic page layouts at the time SOI undertook its redesign. All Web pages contained static content, primarily text in HyperText Markup Language (HTML) or documents in Portable Document Format (PDF). As SOI Web team members developed new page layouts, a guiding factor was to keep, as much as possible, the specifics of the designs within the written guidelines established for irs.gov, but, within those guidelines, to be as innovative as possible. Several new layouts were developed, and these were presented to SOI's panel of consultants for feedback. Based on their feedback, SOI developed a working prototype of the new site using Microsoft FrontPage.

12. While developing the prototype Web pages, SOI met with some of the individuals who oversee irs.gov. At this meeting, SOI presented research results and a detailed short- and long-term vision for Tax Stats and unveiled a few prototype pages. An important feature of this presentation was the use as examples of other, successful Web pages from organizations with missions similar to that of SOI. A few key factors made this meeting successful. First, SOI had empirical research to show that the current irs.gov Tax Stats pages were not serving customers well. Second, SOI was careful to draw a distinction between customers who access tax statistics and those who came to irs.gov in search of tax filing or compliance information. Third, SOI acknowledged the value of design constraints that had been developed to enhance the experiences of the latter group and provided evidence that these very features were making it difficult for SOI's customers to find the products they needed. Finally, recognizing resource limitations, SOI chose to focus on a limited number of requests for changes in irs.gov policies or practices. The results of this meeting included a clearer understanding of SOI's needs, an agreement to make a significant change to the existing irs.gov page structure and a promise for continued dialogue.

⁴ Maurer, Donna and Warfel, Todd, "Card Sorting: a definitive guide," http://www.bboxesandarrows.com/view/card_sorting_a_definitive_guide, 2004.

⁵ The minimum recommended number of card sort participants is 15. While conducting this exercise face-to-face allows observers to record respondent reactions, it is acceptable to mail packages to participants when cost is an important consideration or when conducting the exercise via mail improves participation rates. Nielsen, Jakob, "Card Sorting: How Many Users To Test," <http://www.useit.com/alertbox/20040719.html>, 2004.

⁶ See, for example, "Best Practices in Designing Web Sites for Dissemination of Statistics," United Nations Statistical Commission and Economic Commission for Europe, 2001.

⁷ See, for example, Levi, Michael D., "Usability Testing Web Sites at the Bureau of Labor Statistics," National Institute of Standards and Technology Symposium, Transcript, 1997.

VI. USER TESTING

13. After developing a working prototype Web site, SOI conducted user-testing prior to implementing any actual changes to the Tax Stats pages. While the prototype did not have working links for all 4,000 SOI data products, it included examples of all the page styles that SOI was proposing, including several pages with similar functions, but different design features, in the hope that testing would indicate a clear 'best' choice. After consulting with professional Web developers and SOI's own staff of statisticians, a series of test tasks were developed. Testing was conducted at the BLS cognitive research laboratory, and a trained facilitator administered these tasks individually to a diverse group of seven test subjects while members of the Web team observed from a separate room.⁸ Observers were able to hear each of the test subject's comments, as well as view their facial expressions and all computer key strokes via a computer monitor. Each session was also captured on videotape for future analysis. At the end of each test session, subjects were debriefed using a questionnaire. The test results were used to finalize Web design plans.

VII. IMPLEMENTATION

14. Once the plan was finalized, Web team members set about the task of programming new Web pages. Hierarchies of pages were developed, and design attributes, such as font sizes, spacing, text justification, grid styles and usage, etc., were determined and documented in written guidelines that included instructions and examples to ensure uniformity across pages. Actual programming was performed by individuals with some expertise in the subject matter whenever possible. This ensured that specific content items were correctly categorized and described. To assist in final page design, classroom training in writing for the Web was offered to team members. Once all of the pages were completed, subject matter experts were enlisted to thoroughly test each page for accuracy. In total, nearly 150 pages were developed with more than 4,000 links to content items. The new pages included a new main (home) page and a redesigned left navigation bar. Based on customer feedback, all tabulated data on the site were made available as Microsoft Excel spreadsheets, and all research reports were posted in PDF format, with free readers provided for each. Web pages were nearly all programmed in HTML and were certified as compliant with U.S. standards for accessibility by individuals with disabilities.⁹

VIII. FUTURE DIRECTIONS

15. SOI is currently working to improve several aspects of the Tax Stats Web pages. First, while all of the actual Tax Stats Web pages are certified as accessible to individuals with disabilities using screen-reading software, many of the PDF documents available through those pages are not. SOI is committed to correcting this problem by improving both the techniques used to create the documents and their overall design. The software used to produce SOI documents has recently been upgraded, and SOI is seeking training and advice from desktop publishing experts. The goal is to produce fully accessible PDF documents by the end of 2006.

16. Second, many of the tables on Tax Stats contain extra formatting features that are necessary for creating printed publications but that make certain types of analysis difficult. Customers who use these tables for analysis must first remove some formatting features before applying even simple math functions to the data. SOI has just issued draft guidelines for producing researcher-friendly data tables. These guidelines were developed by incorporating extensive feedback from customers.

17. Third, a prototype application that allows customers to create customized tables from SOI data is being tested on Tax Stats. This application uses off-the-shelf software with custom-designed display screens that allow users to access a database containing tabulated SOI data (microdata are not made available due to privacy protection concerns). Users can combine data across different tax years, select variables of interest

⁸ While five is considered the minimum number of test subjects required to discover the majority of usability problems, SOI determined that its users fell into two broad groups, experienced statistical data users and individuals with a general interest in the U.S. tax system, so that it was necessary to try to get representatives of both groups. Nielsen, Jakob, "Why You Only Need To Test with 5 Users," <http://www.useit.com/alertbox/20000319.html>, 2000.

⁹ See Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as amended by the Workforce Investment Act of 1998 (P.L. 105-220), August 7, 1998 (herein referred to as Section 508).

and choose categories of data to include in a table, as well as calculate simple descriptive statistics using this application.

18. Fourth, metadata designed to help users better interpret the data available on Tax Stats is being developed. Possible metadata items include tax forms marked to indicate the origin of specific data items, written descriptions of individual data items and sample selection information, including variance estimates where applicable. Samples of metadata are currently being tested. In addition, SOI is working closely with irs.gov officials to develop a fully articulated taxonomy of Tax Stats that, in time, will be used to improve search capabilities and navigation, as well as provide common definitions of concepts and terms across all irs.gov content areas.

IX. LESSONS LEARNED

19. Statistics of Income's experience in redesigning the Tax Stats pages on irs.gov serves as a model for other organizations faced with a Web site that is not specifically designed to serve its customer's needs. The resulting redesigned Web pages, while not cutting-edge, nevertheless have garnered favourable feedback from both regular and new customers. More products are now offered on clearer, better organized pages. Product formats have been standardized and, in some cases, redesigned. The effort was not expensive. In fact, the only direct expense was the cost of sponsoring a Web-writing training class. There were opportunity costs in the time spent on the redesign efforts by employees, but SOI's Web team was careful not to let Web design activities interfere with their day-to-day responsibilities. And as is often the case, the team project brought energy to SOI that provided benefits beyond the successful completion of this specific task. The key to SOI's success was involving subject matter specialists and customers in all phases of transforming the Tax Stats pages. This fostered a sense of commitment to the project, a deeper understanding of customer needs and SOI products and the creativity needed to work within the constraints of a design framework that initially appeared to be fundamentally unsuitable. Some specific lessons learned include:

- a Gather specific feedback from users in order to thoroughly understand opportunities for improvement. If possible, involve a group of core customers in redesign efforts.
- b Research best practices used by organizations with similar products or customers. Also examine commercial Web sites since these may reflect the most current design practices and technology.
- c Focus initially on those things that are under the control of the content provider. Consider questions such as:
 - Are products being provided in formats that meet customer needs?
 - Are products and pages accessible to all users?
 - Is content organized and adequately described so that users outside the provider's culture can clearly understand what is being provided?
- d Take as much control over content management as possible. Involve employees who are familiar with the mission and products of the organization in redesign efforts. Keep management informed of team progress and ideas to ensure executive level support. This is especially important if redesign plans require any site-level policy changes.
- e Develop a thorough understanding of design guidelines and restrictions, and, if possible, meet with Web site managers to better understand them.
- f Present research results to Web site managers along with a clear plan for improvement that respects current Web site guidelines. When necessary, propose modifications that will meet the needs of specific customer groups, focusing on a few essential changes.
- g Become involved in the Web site's user group, or urge the formation of such a group if none exists. These are excellent forums for educating Web site managers about customer needs.
- h Prototype and test pages prior to implementing any changes.
- i Continuously monitor user experiences on the Web site. Web pages are not static, but must continue to change as technology and Web practices evolve.

**UNITED NATIONS STATISTICAL COMMISSION and
ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS**

UNECE Work Session on Statistical Dissemination and Communication
(12-14 September 2006, Washington D.C., United States of America)

Topic (i) Communicating effectively on the Web

BLIND FRIENDLY WEB

Supporting Paper

Submitted by the Czech Statistical Office¹

I. INTRODUCTION

1. The issue of web pages accessibility to the persons with special needs is the crucial challenge for webmasters and web designers these days. Czech Statistical Office is one of the first public state offices who have tried to adjust its web presentation for the people who are seriously visually impaired – to those, who can not see at all, or see only a little.

2. This contribution describes the rules for web pages accessibility for users who are seriously visually impaired. Not only blind people (it is impossible for them to obtain the information visually) belong to this user group, but also the users with other visual handicap: users with narrowed visual field, with very serious short-sightedness, tunnel vision or colorblindness (trouble with color sense, more than 15 % of population), errors of refraction (myopia, astigmatism), cataracts, aphakia, glaucoma, retinopathy, etc. Attention is also drawn to other handicapped groups: to aurally handicapped, locomotive handicapped and also to the persons with concentration problems and others.

II. PURBLIND AND BLIND PERSONS

A. Basic information on web pages accessibility for purblind and blind users

3. According to estimates, there are 60 000 to 150 000 people with severe visual handicap in the Czech Republic (CR) – that means approx. 1% of the CR population. In general, it is supposed that 0.6 and 1.5 % of population has some severe visual handicap. For many of them, the web can be a big help and often the only way to perform certain activities independently – whether it be reading news from a news server, ordering wares from an e-shop, or downloading a book from a digital library. Visually impaired users use a special technology for reading the web page content; the technology makes the content accessible for them.

4. Blind people use voice or tactile output to get web page content – with its help, the content of a web page is either read to them, audialised in a synthetic voice, or the text is displayed on a special peripheral in Braille (braille display). A screen reader sends information on what shall be read or displayed to the voice synthesis unit or braille display. The voice or tactile output is not a web page browser, but rather processes a web page loaded from a standard browser (usually Microsoft Internet Explorer, which is the best accessible browser with these technologies).

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4. Purbblind users use a 'software magnifier' that can magnify the web page content. Sometimes the magnification itself is not enough, and a change of color scheme or contrast is necessary. With purblind users it is possible to see the use of not only Microsoft Internet Explorer, but also other browsers (e.g. Mozilla or Opera), because they have features that make the web page browsing easier for purblind users.

5. In developing or upgrading pages with respect to visually impaired users, it is necessary to keep in mind the following facts:

- a blind person is able to obtain the **information in the form of text only**
- the way, the blind user perceives the information on the web page is **linear** – it lacks the global view of displayed information
- a blind user controls a personal computer, and all applications, solely with the use of a keyboard and **keyboard commands**
- a purblind user, using the software magnifier, can see only a **small portion of web page** at the same time

6. Upholding these rules does not only help the visually impaired, but also users with other types of handicap – e.g. motorial handicap of upper extremities (not able to control the computer with a mouse) or with minor concentration disorders (slow reaction on visual stimuli). Adhering to these rules also enables users with a monochrome monitor, users with disabled active components (Java, ActiveX, JavaScript), or users who do not use major browsers, to visit the web page and hence increase the visit rate.

B. High priority rules for the www creation for purblind and blind users

- Graphical objects that are used for the control of a web page should have their textual alternative defined.
- Information communicated through scripts, objects, applets, cascade style sheets, images, and other user side supplements, are accessible even without these supplements.
- All tables make sense being read across rows.
- Image maps are created in such a way that they are accessible to visually impaired users.
- Web page content only changes through a control element activated by the user.
- Frames are created in such a way that they are accessible to visually impaired users (at best, use of frames should be avoided).
- Hyperlinks describe their target, even without the surrounding context.
- Information conveyed by color is accessible even without the color depth.
- Colors of the foreground and background have adequate contrast. A pattern is not used for the background as it reduces readability.
- Rules for font size should not use absolute measures.
- Web page code can be validated according to some final HTML or XHTML specification. It does not contain syntactic errors that the web page administrator is not able to remove.
- Nothing is blinking on a web page quicker than once per second.
- Elements of headings and lists are correctly marked in the source code. Elements that are not part of headings or lists are, on the other hand, not marked in the source code in this way.
- Each form element has a descriptive heading attached to it.

C. Web page accessibility control

7. Web page authors can independently validate accordance with the above rules and recommendations to reveal possible breaches. In this final section, there is a brief description of some validation processes.

8. For web page accessibility verification it is possible to use 'Accessibility Toolbars', containing many features for accessibility testing – for example toggling on/off the style sheets, display of the web page in different screen resolution etc. Toolbars can be downloaded from:

- <http://chrispederick.myacen.com/work/firebird/webdeveloper/> - Web Developer Extension for Mozilla browser
 - <http://www.nils.org.au/ais/web/resources/toolbar/> - Accessibility Toolbar for MSIE 5.0 and higher with enabled JavaScript support
9. Other possibility is to follow these directions:
- Turn off the images in the browser.
 - Turn of the processing of other elements than HTML (JavaScript, Java, CSS etc.)
 - Load the web page in a text mode browser (e.g. LYNX).
 - Copy the textual content of a web page and paste it to a simple text editor.
 - Try to navigate solely with the help of a keyboard.
 - Try to change the size of the browser window and screen resolution in different ways.
 - Set a non-standard combination of colors and font size in the OS and the browser.

III. OTHER HANDICAPPED USER GROUPS

D. Aurally handicapped

10. Aurally handicapped Internet users do not tend to have problems using most web pages. This is caused by the fact that the web still depends on visual presentation. The current state is a result of low occurrence of audio technology in computers and low transfer speed, thus is likely to change. We can expect improvements in both mentioned areas. Therefore, the dependence on sound in conveying important content provides an overwhelming obstacle for the auditory impaired user group, and the web page owner should always provide adequate textual alternatives.

E. Physically handicapped

11. The basic obstacle for these users is that they are not able to use a mouse. It is important to note, that these users comprise those whose handicap is permanent, and so they cannot use their upper extremities at all, or users whose handicap is temporary. For example, they have a plaster on their arms as a result of an injury, etc.

12. Both these groups need to control the content of a web page in another way than using a mouse. So the keyboard is what remains. The web page owners should keep the needs of this group in mind and try to navigate their pages using the keyboard.

F. Users with displaying problems

a. Alternative browser users

We often hear a simplified statement, that the use of a browser is simply a question of choice. There is, however, a large user group, that does not have the choice and have to use a certain browser. Those are e.g. Linux programmers, where the MS Internet Explorer does not work etc. To satisfy these users does not mean to provide them with the same usability in all browsers – according to the functionality of some browsers, it is often impossible (e.g. some browsers display only text – Lynx, Links). It is vital, however, that the main functionality and use is possible in all of the browsers. Responsible www author is therefore thoroughly testing the functionality in different browsers on different operating systems.

b. Users with other displaying appliances

The number of users of different computer types is constantly growing. The differentiation of computers is quite high – big desktop computers, classical notebooks, small minibooks, cellular phones or pocket computers (PDA). The range of display hardware is broad and correctly designed web pages should work properly on all these appliances.

G. Users with learning and concentration disorders

13. Although there is a large group of users with learning and concentration disorders, they are usually not taken into account during the web page creation process. These users can see, hear and use the mouse normally, but they can have the same overwhelming problems with some of the web pages, as the blind users do have. How is this possible?

14. For the users suffering from dyslexia, concentration disorders and similarly impaired users, the web pages with chaotic navigation, large portions of compact text and small font size, are unacceptable. From all the accessible web rules, the techniques for this group of impaired people are the least elaborate. The scope and form of the disorder varies greatly in this user group.

15. Users with learning and concentration disorders need web pages that are well arranged, structured and easily comprehensible, with structured content and well-designed navigation. Increased font size, short paragraphs, a lot of headings, more visual 'gaps', and more pictorial symbols instead of words, etc.

H. Search engines crawlers

16. Thanks to crawlers, new visitors can discover our web pages through search engines. It is therefore strange, that most pages are not optimized for these 'robots'. Inaccessible web pages can render the work of a robot very difficult – in some cases the robot is not allowed to enter other pages, than the homepage.

17. How do these robots work? Simply put – the robot comes to the web page and starts to 'read' the contents. The movement from page to page is done via hyperlinks. It cannot see colors, hear sounds, does not recognize the content of images, and cannot use JavaScript or Flash properly. The core content is thus in text and links and therefore, it is necessary to offer the robot a well-structured content (using headings, paragraphs, lists, font type etc.), to rely on pure text, and not to restrain the navigation to images, JavaScript or Flash. It is thus very useful to test how the crawler sees your web page, whether you are not hiding any important content or navigation links by using an inappropriate technique.

IV. REFERENCES

"HTML 4.01 Recommendation", D. Raggett, A. Le Hors, and I. Jacobs, eds., 24 December 1999.
www.w3.org/TR/1999/REC-html401-19991224/

"Web Content Accessibility Guidelines 1.0", W. Chisholm, G. Vanderheiden, and I. Jacobs, eds., 5 May 1999. www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/

"Techniques for Web Content Accessibility Guidelines 1.0", W. Chisholm, G. Vanderheiden, I. Jacobs, eds., 6 November 2000 www.w3.org/TR/WCAG10-TECHS/

"HTML Techniques for Web Content Accessibility Guidelines 1.0", W. Chisholm, G. Vanderheiden, I. Jacobs, eds., 6 November 2000 www.w3.org/TR/WCAG10-HTML-TECHS/

Best Practice - Pravidla pro tvorbu přístupného webu, MI ČR, 30.7.2004
www.micr.cz/images/dokumenty/BP_web.htm

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Topic (i) Communicating effectively on the Web

FEDSTATS' WORK ON ACCESSIBILITY

Supporting Paper

Submitted by the United States of America¹

I. INTRODUCTION

1. Changes to the accessibility laws of the United States in 2001 required the federal government to actively make technology and information accessible to the disabled—including information on Web sites. Making Web tables and charts accessible is complex and difficult. As frequent providers of complex tables and charts, federal statistical agencies faced a significant burden from the new law. Many government agencies and private vendors began to offer technical assistance, training, and software to make content accessible after the announcement of the standards, but those efforts lacked the level of sophistication and automation needed by the agencies.

2. Federal statistical agencies were frustrated by the lack of guidance and faced a tremendous workload in implementing the new standards. In response, the FedStats Task Force—an interagency task force of U.S. federal statistical agencies—sponsored a workshop June 24, 2002, on the new accessibility standards for Web-based information. The workshop provided in-depth coverage of the requirements that applied to tables, charts, and mathematical formulas. The workshop brought together representatives from all of the principal federal statistical agencies as well as other government agencies and members of the disabled, research, and vendor communities. A white paper summarizing the workshop's findings and outlining an agenda for future work was also published by FedStats.² This paper summarizes the work done by FedStats on accessibility, updates some of the workshop's findings, and provides information on accessibility resources.

II. BACKGROUND

3. August 7, 1998, marked the beginning of a significant change in accessibility policy in the United States with the signing of the Workforce Investment Act, which included the Rehabilitation Act Amendments. One of those amendments expanded and strengthened Section 508—changing the focus of accessibility from providing accommodation upon request, to actively making technology and information accessible.³

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² See http://www.fedstats.gov/policy/publications/fedstats_wp1.html.

³ See <http://www.section508.gov/index.cfm?FuseAction=Content&ID=12>.

4. The amendment to Section 508 requires that when federal departments or agencies develop, procure, maintain, or use Electronic and Information Technology (EIT) they must ensure that the EIT is accessible to federal employees with disabilities. It also requires that all members of the public, disabled or not, have comparable access to and use of information and data from federal departments or agencies. The amendment covers six broad areas of information technology—software applications and operating systems; Web-based intranet and internet information and systems; telecommunication products; video and multimedia products; self contained, closed products; and desktop and portable computers.

5. Section 508 directed the Architectural and Transportation Barriers Compliance Board (known as the Access Board) to set standards for the various information technologies. Those standards went into effect June 25, 2001.

III. FEDSTATS AND SECTION 508

6. The Section 508 guidelines include 16 standards for Web information, based on the Web Content Accessibility Guidelines 1.0 developed by the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C). Most of the standards are focused on making information accessible to those with visual impairments, although some also address hearing and mobility impairments. The standards that pose the greatest challenge to the federal statistical agencies are those dealing with tables and charts.

A. Tables

7. For years, statistical agencies have presented their data in printed tables. With the Internet as a viable means of dissemination, statistical agencies began presenting their tables in a variety of electronic forms, such as ASCII text, Adobe Portable Document Format (PDF), HTML, and various spreadsheet formats. The structure of tables has not significantly changed with the move from print to electronic media.

8. Two of the 16 Section 508 standards apply to tables presented in Web formats and are primarily aimed at making tabular content accessible to the visually impaired. The standards require the following:

(g) Row and column headers shall be identified for data tables.

(h) Markup shall be used to associate data cells and headers cells for data tables that have two or more logical levels of row or column headers.

i. Workshop Findings

9. Of the electronic formats mentioned above, neither ASCII nor PDF (at the time) inherently maintain the structure of a table—presenting data simply as highly formatted lines of text, which makes the association of information with the appropriate labels impossible. Therefore, the workshop focused on the accessibility of tables presented as HTML or spreadsheets.

10. The following issues were identified with respect to tables:

- **There is no agreement on how to mark up tables.** Although the mantra is to “code to the standard,” that standard is rather sketchy. Both the W3C and Access Board offer examples of coding, but those examples are not particularly instructive because they are not of complex statistical tables, are inconsistent both within individual organizations and across organizations, and do not always comply with the HTML 4.01 Specification.
- **Assistive devices interpret various tags inconsistently.** A divide currently exists between what “works” and the standard.
- **Current technology does not allow visually impaired users to use the data as intended.** Statistical tables are generally produced to allow users to make comparisons between numbers, to find logical visual patterns in the data, or to look up a specific piece

of information. The current technology allows visually impaired users to perform only the last task easily.

- **Large, complex tables on the Internet may not be usable to the disabled or other users.** The Internet has expanded the audience for statistical content beyond the agencies' traditional audience of subject-matter experts. Many of the participants at the workshop who were not users of statistical products questioned the need to produce so many large, complex tables. They wished for simpler, easy to understand tables or alternative presentations.
- **Making tables accessible should not make them less usable to sighted users.** The use of white space to visually group similar items in a table poses a problem for some screen readers, which simply stop when they reach a blank cell. Effective techniques for associating metadata, such as footnotes or units of measure, with the respective data do not exist. Also, the extra markup required to make tables accessible results in large files that take a long time to download from the Internet. Lack of speed, including slow download time, is one of the major complaints voiced by Web users.
- **Meeting the 508 standards for large, complex tables poses a resource problem for statistical agencies.** The lack of fully automated, reliable solutions is a significant constraint on the statistical agencies as they try to make the vast number of tables they produce accessible.
- **No methods exist to validate the quality of markup for accessibility.** Although remediation tools are available that can check for the existence of attributes, they are unable to make any qualitative assessment about those attributes.

ii. *Update*

11. Screen-reading software continues to improve with each version released—supporting more features and moving closer to the standards. However, some features require users to change the default settings of their software or access advanced options—something studies have shown few users actually do.

12. More recent versions of Adobe Acrobat now maintain the row and column structure of tables when converting documents to PDF and allow some tagging for accessibility. However, complex tables (for example, those with headers that span multiple columns or rows) require that the resulting tags still be touched up by hand. According to the Adobe Acrobat 7.0 documentation, adding a *ColSpan* or *RowSpan* attribute to a tag is a nine-step process and, because that process is menu driven, it is not open to automation.

B. **Charts**

13. In addition to tables, the federal statistical agencies commonly produce statistical charts and maps—geometric representations of the data that present the big picture, highlight a point, or reveal a relationship not obvious in a table of data. Just as a picture is worth a thousand words, a statistical chart may summarize thousands of data points.

14. Another of the 16 Section 508 standards for Web information concerns making content from non-text elements, including pictures, diagrams, charts, and maps, accessible to the visually impaired:

- (a) A text equivalent for every non-text element shall be provided (e.g., via alt, longdesc, or in element content).

iii. Workshop Findings

15. The following issues were identified with respect to charts:

- **What should the text alternative for a statistical chart include?** Additional guidance is needed on this issue. While tables are often cited as an accessible alternative, providing large amounts of data in a table is not equivalent in purpose to showing the “big picture,” which is the purpose of many graphics.
- **What are acceptable alternatives for content that cannot be made truly accessible, like maps?** While several agencies provide a telephone number for disabled users to call if they need the content explained, that solution does not provide disabled users with the same 24/7 access to information as nondisabled users.
- **Existing assistive technology is not well suited to the presentation of statistical graphics or maps.** The current focus of the standards is to convey meaning through text—either aurally or as Braille. However, other technologies, such as tactile browsers or software that renders curves as varying sound pitches, may be more effective. Also, there may be differences in how people who have never had sight and those who were once sighted perceive graphical information.
- **Current graphic formats do not maintain underlying structural image information.** Although alternative graphics formats that retain structural information, such as SVG, do exist, they are not yet widely supported.

iv. Update

16. Although several agencies have begun offering graphics in SVG format, there is still not widespread support for it among browser and assistive technologies. Users are often required to install plug-ins to view content in this format.

17. Since the meeting, several vendors have developed software to automatically create the text descriptions for charts. Chart Explainer by CoGenTex automatically generates summary text descriptions from the underlying data used in trend charts and bar charts.⁴ PopChart by CORDA Technologies generates graphics from dynamic queries and includes the data required to meet the 508 requirement.⁵

C. Mathematical Formulas

18. Statistical agencies, like many agencies involved with scientific endeavors, use mathematical formulas based on notation that is not in the regular ASCII character set. Most agencies present formulas on Web pages as images. Therefore, the same requirements that apply to charts apply to formulas: a text rendering of the formula that can be read by a screen reader must be provided. However, writing complex formulas out in text is not a good way to present this information. In addition, although this method addresses the needs of blind users, it does not address the challenges faced by those with low vision. For example, an older user may need only to enlarge the font size on his or her browser in order to use the Web, but an equation that is inserted as an image will not scale proportionally with the text around it.

19. The workshop’s findings on this topic are very simple: MathML is the standard for the presentation and communication of mathematics. Therefore, it is imperative that the browsers and assistive technologies incorporate this standard as soon as possible. In addition, the statistical agencies should begin to tag their formulas using MathML.

20. Many browsers now support MathML. While some still need a plug-in to render MathML, many browsers natively include this functionality as long as the user has the proper fonts available.⁶ Assistive technologies are also starting to formally include support for MathML; however, there are many reports of issues in the current implementations.

⁴ See <http://www.cogentex.com/products/chartex/index.html>.

⁵ See <http://www.corda.com/products/popchart/>.

⁶ See <http://www.w3.org/Math/XSL/>.

IV. SUMMARY

21. Based on the response to the FedStats workshop and continued correspondence related to the workshop materials, there is great interest in finding ways to meet the Section 508 requirements as they relate to statistical material. First and foremost, agencies are looking for clear guidance in what is needed to meet the requirements. Even though they are very willing to make their content conform, they often face serious resource constraints that could be eased somewhat with fully automated, reliable solutions and better tools for validating the quality of markup. Additionally, the federal statistical agencies recognize that just meeting the minimum requirements falls short of the ultimate goal to make statistical content usable for all.
22. Overall, the workshop was a good first step. It succeeded in drawing attention to the problems the agencies were having. Since the workshop, there has been progress—vendors have responded with improvements in their products and several of the agencies have developed automated solutions.
23. Also, more testing with blind users is starting to be done. For example, between November 2002 and February 2003 the Communication Technologies Branch of the United States National Cancer Institute conducted usability tests with 16 blind users using screen readers as they worked with Web sites.⁷ While that study resulted in 32 guidelines, none of those guidelines addressed the issues of interest to the federal statistical agencies.
24. The Access Board recently announced plans to review and update the standards for EIT covered by Section 508. In addition, the board is now coordinating its work with international organizations to “advance global harmonization and standardization.”⁸ During the public comment period, the federal statistical agencies will have the opportunity to share their experiences and frustrations with the current standards. And, hopefully, some of the needed specificity and guidance will be forthcoming.
25. However, more discussion with the disabled community is still needed to ensure that the implementation methods selected meet the needs of that community. Additional research is needed to make statistical content usable to the disabled, to identify new ways of presenting statistics, to determine how these requirements could be leveraged to help sighted users, and to develop new methods for presenting statistical content to the disabled.

V. RESOURCES

26. Appendix E of the white paper contains an extensive list of accessibility resources, including general resources, vendor resources, and accessibility tools. Below are links to some good starting points for learning about accessibility, in general, and Section 508, in particular.

- Access Board Section 508 Homepage: <http://www.access-board.gov/508.htm>
- FedStats (links to workshop proceedings and white paper): <http://workshops.fedstats.gov/>
- GSA’s Section 508 Web site: <http://www.section508.gov/>
- Information Technology Technical Assistance and Training Center:
<http://www.ittatc.org/>
- *Research-Based Web Design & Usability Guidelines* (Chapter 3 covers accessibility):
<http://usability.gov/pdfs/guidelines.html>
- Usability.gov Accessibility Resources: <http://www.usability.gov/accessibility/>
- Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C):
<http://www.w3.org/WAI/>

⁷ See *Guidelines for Accessible and Usable Web Sites: Observing Users Who Work With Screen Readers* at <http://www.redish.net/content/papers/InteractionsPaperAuthorsVer.pdf>.

⁸ See <http://www.access-board.gov/news/508update.htm>.

**UNITED NATIONS STATISTICAL COMMISSION and
ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS**

UNECE Work Session on Statistical Dissemination and Communication
(12-14 September 2006, Washington D.C., United States of America)

Topic (i) Communicating effectively on the Web

**PERCEPTION, PROCESS, PERFORMANCE: WHAT WE NEED TO KNOW TO IMPROVE
THE QUALITY AND USEFULNESS OF OUR WEB WRITING**

Presented by: Thom Haller
Executive Director, Center for Plain Language
Principal, Info.Design, Inc.

To display data effectively, we must have some understanding of visual perception. In this presentation, Thom will introduce us to some underpinnings of how humans experience online structure and content; and then lead us through a process for supporting those humans who visit our sites. He'll show how a user-focused framework can support us in making content decisions about what to leave in and what to take out. And he'll show us how we can link our writing to organizational measures of effectiveness so everyone can see the advantages of structure and clarity.

###

Thom Haller, teacher, speaker, writer, and user-advocate teaches principles of performance-based information architecture and usability. He has more than 20 years experience developing communication products (technical, instructional and marketing materials) for government, associations, and business.

Thom is a noted facilitator and speaker. He has developed and run facilitator-led workshops for Federal agencies, associations, and corporations. As a speaker, he's served as a keynote for Society of Technical Communication, Federal Web Content Managers, IEEE, Association of Professional Communications and others. He is a frequent speaker at Internet Usability conferences.

Thom is founder and principal of Info.Design, Inc. (a consultancy and think tank dedicated to exploring strategies improving user experience). Thom and his team of colleagues help organizations learn the fundamentals of information structure and techniques for producing "performance-focused" content.

Thom teaches courses in user-focused design and structure. His academic work includes developing and presenting classes for The University of Maryland's Professional Writing Program, Johns Hopkins University School of Engineering, Georgetown University's Center for Professional Development (where Thom taught the course Visual Display of Information) and USDA Graduate School, where Thom received the prestigious USDA Faculty Excellence Award.

Thom serves as Executive Director for the Center for Plain Language. In this capacity he enrolls others in a mission to increase the usefulness and efficiency of government, legal, and business documents. Talk to Thom about becoming a member of the Center.

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Topic (i) Communicating effectively on the Web

BLOGS: ARE THERE APPLICATIONS FOR STATISTICAL AGENCIES?

Invited Paper

Submitted by the United Nations Economic Commission for Europe (UNECE)¹

I. INTRODUCTION

1. Weblogs, or 'blogs', are fast becoming an important form of online communication. Starting as a way to share personal views, a powerful blogging community has emerged, capable of influencing public opinion and mass media.
2. What is blogging, and are there business applications for statistical agencies? This paper will explore these questions with a simple introduction to the technology, and some relevant examples of its application. It considers possibilities, and provides a list of resources for those that want to know more.

II. WHAT ARE BLOGS?

3. There are as many definitions of a blog as there are 'bloggers', the people that write them. Derived from 'weblog', a blog is a particular type of website. Frequently described as a personal online journal, their most distinguishing feature is that content mainly consists of dated entries, known as posts, appearing in reverse chronological order. New posts are added regularly and often include links to other blogs or websites, forming a network of opinions and people.
4. Blogs fall within the family of 'social software', along with instant messaging, internet relay chat (IRC), and other tools for online communication. Blogging systems have the optional feature to allow readers to respond to posts with their comments. This ability to interact, along with the personalized style of writing, is what sets them apart from other websites.
5. Since their inception in the mid 1990s, the growth of blogs has been rapid. There are nearly 50 million blogs currently in existence, with about 75,000 new ones being created every day². In 2004, United States dictionary publisher Merriam-Webster made 'blog' its word of the year, based on the number of searches for the term³.
6. Blogs have made publishing on the internet easy, free, and accessible to anyone with a computer and an internet connection. This has revolutionised communication and mass media, by providing a means for unbiased reporting and voicing opinions.

¹ Prepared by Jessica Gardner, United Nations Economic Commission for Europe (jessica.gardner@unece.org).

² As reported by Technorati, search engine and monitor of weblog activity (<http://www.technorati.com/about/>)

³ Merriam-Webster's Words of the Year 2004, <http://www.m-w.com/info/04words.htm>

A. Business applications

7. There are good reasons why businesses and organizations are starting to take notice of blogs:
- **They represent a new communication channel** – organizations are using blogs as a new medium through which they can communicate in a casual, readable fashion. Readers can leave valuable feedback through comments.
 - **There is useful information in the blogosphere** – the blogosphere, jargon for all blogs, can be searched to reveal discussions about your organization, products, and/or services. Public opinion about particular issues can be monitored.
 - **Bloggng systems are good for knowledge management and internal communication** – useful applications are emerging from within organizations. Blogging systems are being used for ‘grassroots’ knowledge management and internal communication, and can deliver results faster than complex systems implemented from the top down. They are inexpensive, simple to use and quick to deploy.

“...you can look at blogging as a disruptive pain in the neck that's just for kids or egomaniacs who want to write about their hobbies. Or you can say, wait a minute, this is a new channel and a new form of communication that can improve productivity...”

John Patrick, expert on Weblogs⁴, 2003

B. Issues and challenges for organizations

8. Publishing on behalf of an organization, on the internet, or any medium, carries particular responsibilities. Policies should be written or revised to ensure blog content complies with organizational expectations. For major technology supplier Sun Microsystems, blogs have caused a shift from a company policy of no public comment without legal clearance, to open slather. Realising that blogging is particularly popular with ICT specialists, Sun encourages their staff to create individual blogs, as long as they follow company guidelines⁵.

9. "Unbiased reporting" is mentioned as an advantage of blogs, but it is also a criticism: there is no control over biased reporting. In bureaucracies there is a hierarchical system of clearing information for release that supposedly eliminates bias. Who controls this in a blog? The boundary between official statistics and unauthorised comment can become blurred. This is likely to be an inhibitor to statistical agencies embracing blogs. To counter this, Wikipedia (see paragraph 17) does not have the "normal" controls that traditional encyclopedias have, but has proven to be remarkably robust, reliable and accurate, with peer pressure ensuring this. It also is very comprehensive and up to date. Yet, it is still a long way short of being accepted as an authoritative information source by bureaucracies. Normal bureaucratic controls have been turned on their head by blogs, as has been the case with the internet.

10. Like every software tool, blogging systems take time for technologists to maintain. Using blogging software, such as [WordPress](#), or [Blogger](#), can greatly reduce the time required to create and maintain a blog. Organizations can choose between user-hosted systems, where control of software and hosting is in-house, or developer-hosted systems, hosted externally and accessed through a web interface. Each differs in terms of pricing and features. Refer to the links in section VI to discover more about blogging systems.

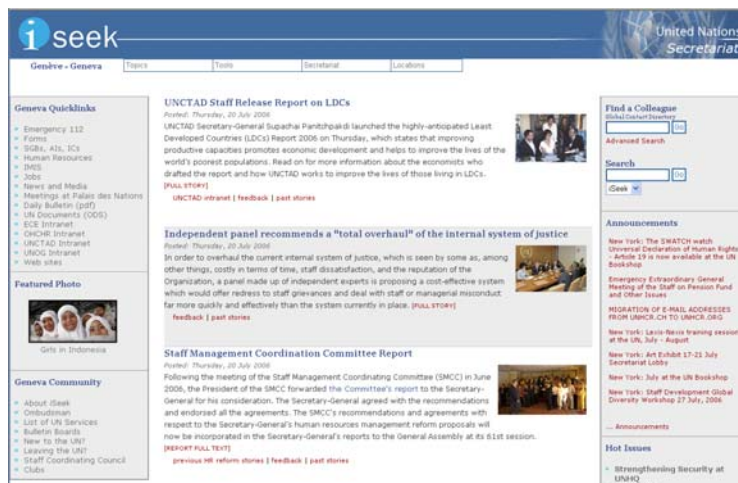
⁴ 2003, *Expert Voice: John Patrick on Weblogs*, CIO Insight, viewed 24 July 2006, <http://www.cioinsight.com/article2/0,1540,1387819,00.asp>.

⁵ 2005, E. Cone, *Rules for the Unruly*, CIO Insight, viewed 24 July 2006, <http://www.cioinsight.com/article2/0,1397,1786024,00.asp>.

III. APPLICATIONS FOR STATISTICAL AGENCIES

C. Using blogs to communicate with staff and customers

11. Corporate blogs are generally divided into two categories: internal and external. Perhaps the most immediate benefit to be gained from blogs is the creation of cost-effective internal knowledge management and communication systems. Blogging software, such as [WordPress](#), [Movable Type](#) and [Radio UserLand](#), can replace the need for more expensive and complex content management systems. They are relatively easy to deploy and to use, providing agencies with an effective means to report on projects, future directions and filtering content of interest. The ability to add comments and track the contribution of others makes them a valuable tool for online meetings and discussion. The categorization, keyword tagging and search features of blogs helps to make information easily discoverable.



The United Nations intranet, **iSeek**, has a blog format. Each post has a headline and an excerpt of the article, allowing quick scanning of latest news, with links to the full story. Posts are added daily and displayed in reverse chronological order.

iSeek has replaced the need for email bulletins to staff in United Nations Headquarters. The system is in the process of being rolled out to all duty stations.

12. External, or public blogs, can be useful for communicating progress on a particular project or event, when regular updates are necessary. The UK's ruralnet conference uses a developer-hosted blog to communicate information and updates about their event (<http://ruralnet.typepad.com/conference/>). It is a good example of a blog that incorporates text and photos, and it even has a pre-conference video tour of the venue. The United Nations Statistics Division used blogging software to create the website on the Millennium Development Goals (MDGs) Indicators (<http://mdgs.un.org>).

<http://mdgs.un.org>

The MDG Indicators site presents the official data, definitions, methodologies and sources for the 48 indicators to measure progress towards the Millennium Development Goals.

It links to related sites and documents, and the regularly updated news keeps readers up to date with ongoing activities on MDG monitoring.



D. Create a policy on blogging


13. Blogs are a reality. Regardless of whether your agency decides to publish one, it should at least have a policy on blogging. Within any organization there are likely to be staff members who publish a blog in their personal time. A policy should make clear any boundaries and expectations about references to work and the workplace. The corporate blogging policy of Feedster, internet technology supplier, provides a good example: http://feedster.blogs.com/corporate/2005/03/corporate_blogg.html.

E. Monitor what the blogosphere is saying about your agency

14. All organizations can tap into the valuable information available in the blogosphere. Blogs can be monitored for comments and discussions on your agency, products, and services. However, remember that the content of blogs is often opinions, rather than fact. Searches can be conducted through sites such as Technorati (www.technorati.com), Feedster (www.feedster.com), or Google Blogsearch (<http://blogsearch.google.com/>). Using a feed reader, such as Bloglines (www.bloglines.com), it is possible to subscribe to your search and receive new results, as they become available.

15. In addition to finding information about your organization, blogs can be used to gather intelligence on a range of topics. If there is a blogger out there writing about your area of interest, they can filter the vast content of the web for you, presenting the most interesting news and links. To facilitate the use of blogs as a source of information for your agency, links to relevant blogs can be included on the intranet.

IV. A LOOK INTO TECHNOLOGY

16. **RSS feeds** are an extremely useful feature of blogs and other websites. RSS, also known as Really Simple Syndication, uses XML to structure and disseminate information. Wherever you see RSS symbols, such as , **XML**, or **RSS**, you know there are feeds available from that website. A ‘feed’ is an XML file and looks similar to HTML code. They are retrieved and ‘read’ by a feed reader and formatted into something more comprehensible. Users are alerted when new content is added to the feed.

17. Blogging systems provide a unique RSS feed associated with each blog. If time is not an issue, you can individually visit all the blogs and websites you want to read, or, you can subscribe to their feeds and view the latest content in one window. Online tools, such as Bloglines (www.bloglines.com), are free and easy to configure.

F. Associated technologies

18. A **wiki** is a website that allows its users to easily create, edit or remove content using their internet browser. Derived from the Hawaiian term ‘wiki wiki’, meaning quick, wikis are an effective tool for collaborative writing. One of the most successful examples of a wiki is Wikipedia (<http://en.wikipedia.org/>). Established in 2001, Wikipedia is a free online encyclopaedia that anyone can edit or contribute to. Today it counts over 4.5 million articles in more than 200 languages.

19. **Podcasting** is the broadcasting of audio files using RSS feeds, which can be played online or downloaded to a personal audio player. The term is a compound of “iPod” and “broadcasting”, although an Apple iPod is not required to use them. A directory of available podcasts can be found at sites like podcast.net (<http://www.podcast.net/>) and Podcast Directory (<http://www.podcastdirectory.com/>).

V. CONCLUSIONS

20. Blogs provide a new method of communication and are proving to be more than a passing fad. Their use has grown exponentially and relevant business applications are now emerging. Organizations are using them to communicate with customers in a more personalized way, and are gaining valuable feedback through reader comments. Blogging systems are inexpensive and can provide quick results for internal knowledge management and communication. A blog can be a good choice of website for communicating with the public about a particular project or event.

21. The blogosphere is a valuable resource for any organization. Statistical agencies should monitor blogs as they do other media and communication channels. Associated RSS technology makes this possible with minimal effort. Finally, a corporate policy on blogging should be developed, regardless of whether an agency decides to publish its own blog.

VI. TO KNOW MORE

Information and examples of user and developer-hosted blogging systems:

http://en.wikipedia.org/wiki/Blog_hosting_service

General information on blogs and links

<http://en.wikipedia.org/wiki/Blogs>

Blog search engines

www.technorati.com

blogsearch.google.com

www.feedster.com

Blogging 101

<http://www.unc.edu/~zuiker/blogging101/index.html>

Glossary of blogging terms

http://en.wikipedia.org/wiki/List_of_blogging_terms

VII. REFERENCES

About Technorati, 2006, viewed 24 July 2006, <<http://www.technorati.com/about/>>

Amanda Lenhard, 2006, Bloggers : a portrait of the internet's new storytellers, Pew Internet and American Life Project, viewed 24 July 2006

<http://www.pewinternet.org/pdfs/PIP%20Bloggers%20Report%20July%2019%202006.pdf>

Bonnie Shucha, 2006, *Blogs the Hot New Technology for Communication and Information*, University of Wisconsin Law Library, viewed 24 July 2006, <<http://library.law.wisc.edu/wisblawg/alamontreal.ppt>>

David Kirkpatrick, 2005, *Why there's no escaping the blog*, Fortune, viewed 24 July 2006, <http://www.csulb.edu/~mwolfin/No_Escaping_Blogs.doc>

David Strom, 2006, *How to be a better blogger -- and still keep your day job*, Computerworld, viewed 24 July 2006, <<http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=9000792>>

Edward Cone 2005, *Rise of the Blog*, CIO Insight, viewed 24 July 2006, <http://www.cioinsight.com/article2/0,1397,1786020,00.asp>

Joseph Carmichael and Shawn Helwig, 2006, *Corporate Weblogging Best Practices: a guide for enterprises seeking to leverage corporate blogs*, UW E-Business Consortium, University of Wisconsin-Madison, viewed 24 July 2006, < <http://www.uwebc.org/opinionpapers/archives/docs/CorporateBlogging.pdf>>

Nora Ganim Barnes, n.d., *Behind the Scenes in the Blogosphere*, University of Massachusetts, Dartmouth, viewed 24 July 2006, <<http://www.umassd.edu/cmr/studies/blogstudy.cfm>>

RSS File Format, 2006, Wikipedia, viewed 24 July 2006, <http://en.wikipedia.org/wiki/RSS_%28file_format%29>

Weblogs, 2006, Wikipedia, viewed 24 July 2006, <<http://en.wikipedia.org/wiki/Weblog>>

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UNECE Work Session on Statistical Dissemination and Communication
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Topic (i) Communicating effectively on the Web

THREE YEARS OF ‘INTELLIGENT GRAPHICS’

Supporting Paper

Submitted by Federal Statistical Office of Germany¹

I. INTRODUCTION

1. In 2003, the Federal Statistical Office of Germany (Destatis), in collaboration with the Office for National Statistics of the UK (ONS), started to add interactive graphics to their internet offerings.
2. It began with an animated population pyramid for Germany's 10th coordinated population projection in 2003. A year later, an interactive mapping application for the European Election, and a database-driven Atlas for regional statistics, extended our range of “intelligent” graphics on the web. In the beginning of 2005 we introduced an Index Calculator for a personalised inflation rate to better understand price statistics. Lastly, results of the general election of 2005 were published with an adapted version of our interactive Atlas.
3. This paper will examine the success of interactive graphics up to this point and identify recent challenges, three years after Destatis began using interactive graphics on the web as a means to better communicate statistics.
4. Finally, the technology used, namely Scalable Vector Graphics (SVG, an XML- based open standard for publishing data driven graphics on the web), needs to be evaluated so that interested parties can judge for themselves if they want to follow this route. As far as we know, SVG technology is used on the websites in the following statistical offices: ONS, Statistics Netherlands, Statistics Norway, Czech Statistics and the Australian Bureau of Statistics.

II. THE SUCCESS SO FAR

A. What Makes Graphics Intelligent?

5. We call graphics ‘intelligent’ in this context when they meet three requirements:
 - Being data-driven
 - Allowing user-interaction
 - Making use of animation

¹ Prepared by Doris Stärk (*doris.staerk@destatis.de*), Michael Neutze (*michael.neutze@destatis.de*).

6. Being **data-driven** is important for easy, frequent, and possibly automated updates to the data without interfering with the application logic or the graphic's layout. **User interaction** is the key concept whereby users can explore the data in new ways compared to static publications. **Animation** can make understanding time-series a lot easier.

7. With graphics like these we can amend our traditional publications tremendously, and we can only do this in a medium such as the web.

B. The Examples So Far

8. The Animated Population Pyramid is the classic example. In its static occurrence, a population pyramid is a two-dimensional graph with three data dimensions: population count, age, and sex. Adding animation can make the fourth variable "time" visible, thereby demonstrating the demographic concept that most of the following year's population already exists today and that the age-structure is like a growing tree.

(www.destatis.de/basis/e/bevoe/bev_svg_var.htm).

9. The Regional Statistics Atlas offers more than 100 fully customizable choropleth (thematic) maps (www.destatis.de/atlas/atlas.htm). This application is only available in German.

The Atlas is provided with additional statistical tools like a histogram that helps users more easily understand the distribution of values and makes analyzing regional disparities and outliers a much more interesting experience.

10. The Index Calculator (www.destatis.de/indexcalculator) was developed in the framework of a new communication policy to better explain the complex statistical results. The Index Calculator for a personalised inflation rate allows people to mix their own basket of goods, or more precisely, to adjust the weighting patterns of the basket of goods. People who don't smoke, for example, can set the weight for tobacco to zero. Thus individuals can develop a better understanding of how the average inflation rate is calculated and how individual consumption patterns can differ.

C. What Worked Best?

11. It turns out that the simple graphics win in the end. While the Atlas is the most sophisticated application and the Index Calculator might be the most revolutionary for official statistics ("we can't allow people to calculate different results than the official ones"), it is the population pyramid that got the most attention in the long run. This might be supported by the fact that population statistics receive the most hits on our website.

12. Oftentimes we statisticians overestimate how much time people are willing to spend to understand the facts. This, coupled with the high media attention that Germany's ageing society is getting, shows that the animated population pyramid has just the right mixture of serious data, relatively easy to understand concepts, and visual attraction (it is moving, after all).

13. Last but not least, interactive graphics have become an important part of our public relations activities. With 'intelligent graphics' on our website, we have highly attractive material to present and to make demos at trade fairs a lot more convincing and interesting. They also improve the image of official statistics.

D. Major Drawbacks

14. Many audiences still are not ready to accept new forms of communication and judge everything by the standards of the Gutenberg universe. To this day, for example, in the German Parliament and at the location where our most prestigious press conferences take place, projected media (slides, websites etc.) are not permitted.

15. Then there are the technical roadblocks. Interactive Graphics usually require more modern browsers or even additional plug-ins, which many users are unwilling or unable (lack of administrator rights) to install. This is a serious problem especially for our professional users.

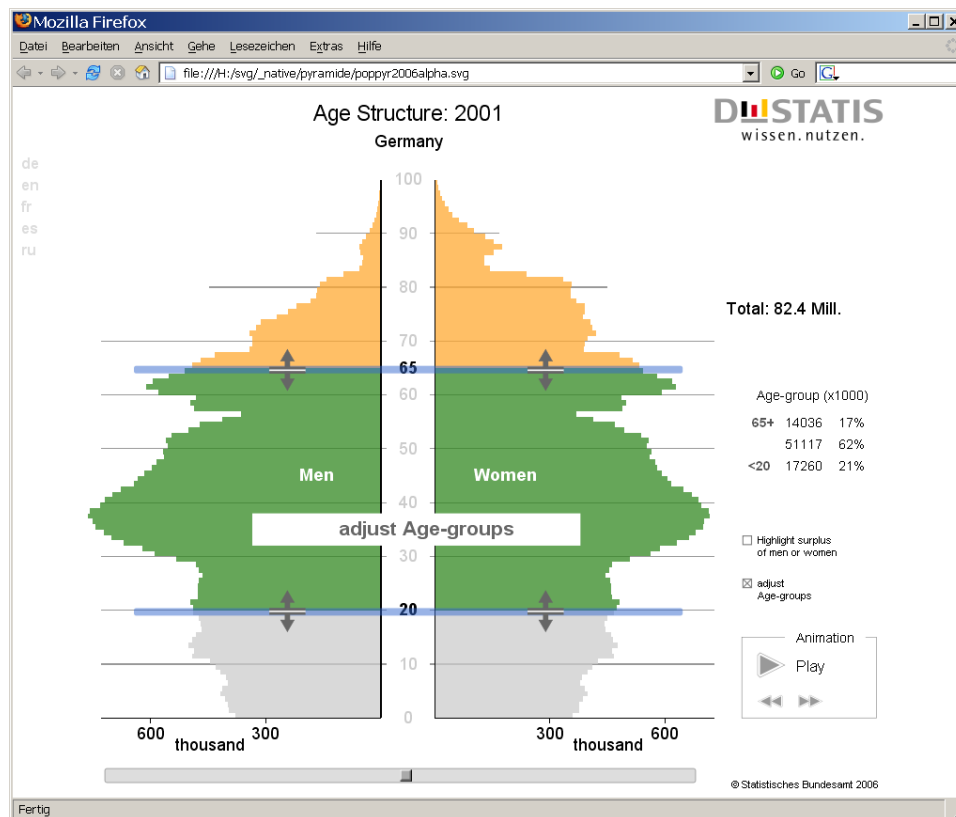
16. Finally, people don't look for something they don't expect, and the space on the front page to promote these new features of the website is limited. In many ways our graphics get a lot of applause when demoed directly to people, and they usually tell us afterwards they had never imagined that we would have such high-quality content on our website. Therefore, it is very important to implement new developments into an active public communication strategy and to use even the traditional printed publications as an additional reference medium to promote the interactive content on the web. Making use of screenshots that reveal the main functionality is very important, as are technical feedback and support channels and training of involved colleagues.

III. CURRENT DEVELOPMENT

E. A New Interactive Population Pyramid

17. As we have seen, the animated population pyramids were the most successful of all those 'intelligent graphics.' They are somewhat close to what people may have seen already (a population pyramid), and are extremely effective in explaining how population projections work. They touch a very hot topic in the political debate of Germany which is the massive ageing of the population we're facing in the coming years.

18. Our goal for the forthcoming 11th coordinated population projection, which is to be published in November (we do population projections every three years) is not only to build on the current success but to further enhance it. The enhancements are threefold: To make it run on as many devices as possible 'right out of the box', to add often-requested features that allow for more flexible research on the data, and to have more features available in a single graphic by using an improved interface.



The new population pyramid runs natively on modern Browsers like Firefox 1.5+ or Opera 9 (out of the box, no installation required). A main new feature is adjustable age-groups via drag & drop. The following languages are included: English, German, French, Spanish, Russian

19. It is now technically possible to implement interactive data-driven graphics with the SVG technology that runs on a multitude of devices. Backwards compatibility is important so that users of MS

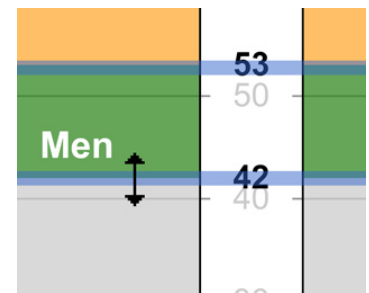
Internet Explorer with the Adobe SVG plug-in who used our interactive offerings so far will not have to change their technology again.

20. In addition, modern browsers like Firefox (since Version 1.5, November 2005) or Opera 9 (June 2006) can display these applications without any additional helpers, just like html pages. Finally, many mobile phones support the SVG language and can display a subset of the animated pyramid. While the functionality on a phone will obviously be limited, we see it as a great public relations opportunity to show and disseminate the file to interested people from phone to phone (it is very small, less than 50kB) and tell them that the same file will 'come to life' on their desktop computers and will include a 100- year dataset.



21. The animated population pyramid derives its strength from the projection data. In many political discussions about all matters in society - be it pension systems, planning of future kindergarten or school capacities, to name just a few - the future population of distinct age-groups is of great importance and is often asked for. Here, our printed publications as well as our database can offer only pre-conceived age-groups that cover the most often- used cases.

22. With our new interactive population pyramid we offer these customised age-groups. There are two variable age-dividers that allow for the creation of every conceivable combination of three age-groups by simply dragging the dividers with the mouse. Population counts and percentages are calculated on the fly and the age-groups are coloured accordingly, even while the pyramid is in motion.



*Customizable age-groups
by dragging the blue bars*

F. Supporting Material

23. Our experience teaches us that many people want to integrate an animated population pyramid in their PowerPoint slides. This means they need a movie of the animation. While this slightly counters the notion of interactivity, it is a valid demand that can be easily met. Starting with the 11th coordinated population projection, we will offer screen- captured video material from the animated population pyramid that can be included in PowerPoint slides.

24. While every population projection has different parameters and will be calculated in different variants, most users care only about the medium variant. The animated population pyramid will therefore only cover the medium variant but will link to comprehensive material (both web and print) about all aspects of the projection.

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Topic (i) Communicating effectively on the Web

RICH INTERNET APPLICATIONS

Supporting Paper

Submitted by the United States of America¹

I. INTRODUCTION

1. While the Web revolutionized how information is accessed, it has been slow to move past a simple page-based model into truly interactive experiences. Many technologies have tried to make the Web experience more interactive—for example, JavaScript, DHTML, and ActiveX; however, inconsistent support across browsers has limited their success. In addition, many “hacks” have been developed to push browser-based technologies to their limits—often at the cost of standards-based development. A notable example is the use (or misuse) of tables in HTML to control the positioning of elements and to create sophisticated layouts with multiple columns. However, all that may soon change. Just as the Acrobat Reader has become a widely supported, cross-platform solution for delivering printed information, the Flash Player is emerging as the standard for delivering robust interactive experiences—“rich internet applications” (RIAs).²

2. Flash has traditionally been thought of as a designers’ tool, using “stages” and “timelines” in the development of sophisticated animations. With the MX release of Flash, applications delivered within the Flash Player could start exchanging data with servers; however, programming such applications was rather tedious. Then, in 2004 Macromedia (now Adobe) introduced the Flex framework, which greatly simplified application development. The Flex framework includes an XML-based language, MXML, and an implementation of ECMA Script called ActionScript. In addition, the framework also incorporates many standard Web technologies already in place, such as CSS for styling and GIF, JPG, PNG, and even SVG for graphics. While the traditional Flash tools will remain the standard for designing animations, innovations over the past two years have given developers new options for creating richer, more interactive applications.

3. Initially, the main drawback with the Flex framework was the need for a very expensive application server to deliver these new applications. With the release of Flex 2.0 in mid-2006, that will no longer be the case. While a server component will still be required for applications to implement advanced data services—such as messaging, data management services, and RPC services—it will no longer be needed for all applications.³ Thus, making application delivery in the Flash Player a viable new alternative worth consideration.

¹ Prepared by Laurie Brown (Laurie.Brown@ssa.gov), U.S. Social Security Administration.

² While varying definitions of “rich internet applications” exist, this paper focuses on those that are delivered using the Flash Player.

³ Adobe offers four products as part of its Flex family. A free SDK is available that includes the core components library, development languages, and a command-line compiler and debugger. For those needing a more robust editing environment, an Eclipse-based IDE, Flex Builder, is offered. Like many Web technologies, other editors are also available. For more advanced applications, Flex Charting offers extensible charting components, and Flex Data Services provides advanced data services, as discussed above.

II. BENEFITS OF RIAs

A. A New Model for Interaction

4. RIAs move beyond the page-based model associated with HTML browsers. Instead of a request/response paradigm with frequent page refreshes, RIAs deliver content seamlessly, providing an experience more like that of a desktop application. They can offer a better user experience in several respects:

- RIAs can execute logic on the client side; they do not need to call back to the server each time the user performs an action. HTML is developed as a series of files that get delivered individually to the users. While RIAs do consist of many pieces, it is a single, compiled application that is delivered to the user.
- RIAs can make asynchronous server calls, returning control of an application immediately to the user.
- RIAs can receive information broadcasts. For example, rather than making a call back to the server at a specified time interval to refresh a set of headlines or financial data, an RIA can simply register itself with a service and automatically be contacted when something changes.
- RIAs can progressively disclose information to the user and provide better feedback with state transitions.

5. Let's compare how two simple applications—a glossary and a data query—could be implemented in HTML and as an RIA.

6. First consider a glossary application that allows a user to look up a word while reading a document. With HTML, this type of application could be implemented several ways:

- a link to a separate glossary,
- a simple form included on the document page, or
- frames.

With the first two options—a link or a form—the definition may be returned as a new page in the same window or may spawn a new window (either a new browser window or a popup box). In either case, it is difficult for the user to view the definition in the context of reading the document—either the document page is no longer displayed in the browser window or it may be obscured by the new window. While those problems can be avoided by the use of frames, frames take up a great deal of screen real estate—even when they are not in use.

7. With an RIA, a glossary tab could be situated unobtrusively off to the side of the document window—taking up very little space. When the user needed to use the glossary, the tab could be activated and both the glossary area and the document area dynamically resized without a page refresh. The user could then choose to leave the glossary sitting open as they continued to read the document or close it when it was no longer needed. This type of progressive disclosure means that the user is not distracted by information that may not be relevant to the initial task at hand and allows for a much more efficient allocation of screen real estate.

8. Now consider a simple data query application. With a traditional HTML model, users would likely fill out a form with their criteria—for example, calendar year data from 1990 to 2005, submit the form, and then receive a page back that lists the data concepts available that match their criteria. While this model lets users know what is available that matches their criteria, it fails to let them know what has been excluded as a result of their choices.

9. With an RIA, all the data concepts available could initially be listed and then progressively greyed out as the user incrementally narrows their criteria. With this approach, users are better able to understand the tradeoffs they are making with each new selection criteria they impose.

B. Extensibility

10. Both the MXML and ActionScript components of the Flex framework are extensible: Existing components may be customized, their functionality extended or overridden; existing components may be combined to create new functionality; or entirely new components may be built from scratch. Those familiar with Java will recognize many of the terms and techniques used in the technical discussions of extensibility.

C. Accessibility

11. Unlike HTML, MXML was designed with accessibility in mind from the start. HTML repurposed attributes that already existed in the specification for accessibility. Consider, for example, a graphic navigation button; the “alt” attribute of the given image tag may be used to specify a tool tip for a sighted user or an alternative text label to be read by a screen reader for a visually impaired user. However, the designer must choose between these two options—or, in some cases, the choice has been made for them by accessibility legislation. MXML, on the other hand, includes separate attributes for accessibility. Therefore, a graphic navigation button specified in MXML can have both a label and tool tip associated with it, both of which are visually presented to the sighted user and read to the visually impaired user.

III. EXAMPLE APPLICATIONS

12. A number of RIAs currently exist on the Web. While some are full-fledged working applications, many others have been developed as a proof-of-concept by developers starting to experiment with RIAs. (Note: The examples provided below are provided solely as technical demonstrations.)

- Audio Visualization Component – <http://lab.benstucki.net/archives/visualizationexplorer/>

Displays sound data in a user-selected format. In addition, the user can customize several aspects of the presentation.

- Genworth Financial Retirement Income Gap Calculator – <http://www.gefinancialassurance.net/calculators/incomeGap.mxml>

Notice how the graphics to the right immediately incorporate any changes made to the assumptions on the left. In addition, users can toggle between the graphics and a data table of the same information using the accordion panel control.

- Links to additional applications may be found at <http://www.adobe.com/devnet/flex/?tab:samples=1> and http://www.adobe.com/devnet/flex/community_samples.html

IV. CONCLUSION

13. Although a relative newcomer on the Web technology scene, RIAs hold a great deal of potential for improving the user experience. Because RIAs draw on many standard technologies—XML, DOM, Web services, Java, HTTP, standard graphic formats, and CSS—the best practices and programming models already learned by developers can be employed. For example, the typical three-tier architecture of Internet applications still applies. Because there is extensive support for existing middleware solutions, in many cases, converting a current browser-based application to an RIA may be as simple as redeveloping the presentation tier. In summary, RIAs give developers the opportunity to greatly improve the user experience—moving away from the confines of the request/response model of the Web and into truly interactive experiences that better match users’ expectations and workflow.

V. RESOURCES

14. Additional information about RIAs and the Flex framework may be found at the following Web sites:

- Wikipedia - Rich Internet Application – http://en.wikipedia.org/wiki/Rich_Internet_Application
- Flex.org – <http://www.flex.org/>
- Adobe - Flex 2 – <http://www.adobe.com/products/flex/>
- W3C - Rich Web Clients – <http://www.w3.org/2006/rwc/>

**UNITED NATIONS STATISTICAL COMMISSION and
ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS**

UNECE Work Session on Statistical Dissemination and Communication
(12-14 September 2006, Washington D.C., United States of America)

Topic (i) Communicating effectively on the Web

CHEZ INE

Our Statistical Restaurant: how to serve and present our 'dishes'

Invited Paper

Submitted by the Spanish National Statistical Office (INE)¹

I. INTRODUCTION

1. Considering the title of the first topic of the meeting: “Communicating effectively on the Web,” and the funny, but serious style some speakers use in this type of meetings, I decided to prepare this document, which I hope you will find amusing, to present our experience regarding the issue in question.

2. Statistics, despite its ‘hardness’, the profusion of ‘cold’ figures, and the fact that they are apparently thought for ‘brainy’ specialists, can also have attractive applications (educational areas, population clocks,...), and in this respect I can provide my personal experience as on occasion I have played ‘Trivial Pursuit’ with my daughters using curious information from our publication ‘Spain in Figures.’

3. Bearing in mind another event I attended, in which I started a presentation with a ‘statistical’ poem that was welcomed warmly, also makes me assume that the reader of this document will be able to see beyond its seemingly ‘frivolous’ tone, which is far from my intention, to see that a good bunch of ideas are presented, in a style that –in my opinion– is easy to understand.

4. Therefore, this document aims to use an informal tone to present our particular approach on how to make our site more popular, pleasant and, in summary, how to improve its efficiency. We have decided to compare it with a Restaurant, since A picture is worth a thousand words, in this sense referring to written images, or comparative metaphors. So our motto could be, like Simon & Garfunkel said: Keep the customer satisfied.

II. HOW TO DESIGN OUR MENU AND PROVIDE OUR CUSTOMERS WITH AN EXCELLENT SERVICE

5. My Boss once said, referring to me and to one of my colleagues, who is in charge of the website contents, that we were the perfect team. I don’t know if this is true or if it is, in fact, the key that makes things work. However, the arguments he presented to support that statement are spot on: “On the one hand, she provides the perspective of a statistician, the rigour and the technical mentality; and on the other you (the person writing this document) provide the perspective of a non-statistician, of a computer scientist, a ‘normal’ user and a seasoned Internet user.”


¹ Prepared by Fernando Villa Benito, Spanish National Statistical Office (fvilla@ine.es).

6. Moreover, I would also say that several enriching combinations converge at the INE, providing a vast wealth of perspectives, since the team that generates the contents of our website is made up by women and men, young and old people, statistical and non-statistical personnel, staff and external personnel... In all, a great variety of points of view, with different concerns and education that generate a plethora of ideas during our versatile and mixed 'brain storming' sessions.

7. Consequently, the answer to this first question would be a variety of personalities that result in an excellent, vast and exquisite menu, or at least we hope they do.

III. HOW TO HELP OUR CUSTOMERS SELECT THEIR 'DISHES'

8. At INE we always try to consider two types of customers: exquisite 'gourmets' (specialist statisticians), who know what they are looking for and even the technical names that tell them where the information they are looking for can be found, and 'normal' users, who do not have a 'gastronomic' (statistical) background. To help both customers with their selection, we have two ways of wording the sections where the same information can be found.

Example. First 'course': How to find the desired  ?

Links for 'normal' customers:



Do you wish to update a rental income?
How much has the CPI varied since..?

Link for 'gourmets':

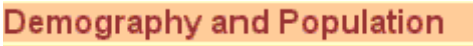


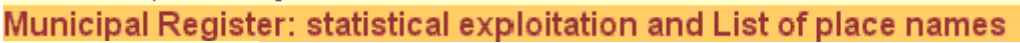
2nd 'course': A very technical 'dish' with a very technical and almost unpronounceable name: 'Nomenclator'

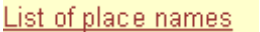
For 'normal' customers:

How many people live in ...
Write the name of the place
  

For 'gourmets':








Shortly, the idea is to provide different names for the same 'dish.'

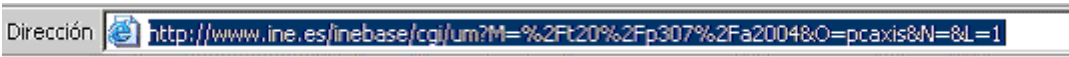
IV. HOW TO MAKE OUR RESTAURANT AVAILABLE TO CUSTOMERS FROM ALL OVER THE WORLD?

9. Providing the possibility of browsing our whole website in two languages, which users can switch to and from easily, and not only at the home page.



V. HOW TO MAKE IT EASIER FOR OUR CUSTOMERS TO 'TASTE AGAIN' THEIR 'FAVOURITE DISHES' WHEN THEY VISIT US AGAIN

10. Making most of our pages 'bookmarkables', in consequence easily possible to be converted in a favourite link.



VI. HOW TO HELP OUR CUSTOMERS SELECT THEIR 'MENUS' (DISHES) AND HOW THEY WISH TO RECEIVE THEM

11. Always using well-known icons, taken from widespread products or 'inventing' icons whose meaning can be guessed easily.

Examples of icons: 'Clear all,' 'Select all,' 'Reverse order' are



12. We have implemented a user-friendly method to make it easier for our customers to 'season' (configure) how they receive their 'dishes' (data).

- Choose how you want to see your data:

Variables in rows	Variables in columns
<div> <div>↑</div> <div>↓</div> <div>Economic destination of the goods</div> </div>	<div> <div>→</div> <div>←</div> <div>↺</div> <div>↻</div> <div>Index and rates</div> <div>Period</div> <div>↑</div> <div>↓</div> </div>

VII. HOW TO ENSURE OUR CUSTOMERS FIND QUICKLY WHAT THEY WANT

13. Our search engine functions in a similar way to Google's sponsored links, but in our case is by presenting recommended links, which could be seen as our 'special dishes.' This is based on our experiences and an analysis of our customers' 'tastes', which allow us to present what our users really want to find when they look for a 'dish' (concept) in our 'menu' (search engine).

14. We obviously focus constantly on our search engine and continuously research new elements in an attempt to improve the quality of the links we present (via implementation of weights), reducing search times, improving presentation of the results screen, adding new advanced searches... since we think it is essential for our customers to find what they are looking for, placing a great deal of attention on that tool, which is a fundamental aspect of our website, even though we are aware of the high cost of a top-quality search engine.

Recommended links

[Consumer price index](#) All Information about Consumer Price Index (CPI)

[Consumer price index](#) Press section. CPI. Series, detailed results,...

[Consumer price index](#) CPI. Detailed results. Methodology,...

Consumer Prices Index (CPI)
Base 2001. Series from January 2002

Autonomous Communities indices by headings
Variable values: Autonomous Community (National, Andalucía, Aragón, ...) Urban or not Urban (Headings (Cereals and by-products, Bread, Bovine meat, ...) Index and rates (Index, Monthly va rate, ...) Period (2002M01, 2002M02, 2002M03, ...)

VIII. HOW TO GUARANTEE CUSTOMERS CAN CONTACT US EASILY, I.E. 'PRE-' AND 'POST-SALES' SERVICES

15. Our contact e-form (which appears in the footnote of all the pages)...

Paseo de la Castellana, 183 -28071- Madrid - España Tlf: 91 583 91 00 - e-mail: www.ine.es/infoine

[Legal notice](#)

replaced successfully to direct e-mail as the way to request information from the INE or to send us complaints. On the one hand this removed all the unwanted mail we used to receive, and on the other, since the user has to select the subject for the query, thanks to the application used to manage the requests, it has allowed us to channel the e-mails, so that they are sent directly to the department that will answer them, thus reducing response times, and also improving the quality of the response. In all, this contributes to improving the service and responses received by our customers when faced with possible complaints or requests.

- Teléfono / Phone: _____ - Fax: _____

Mensaje **Message**

- Asunto / Subject * : - Seleccione un tema / Select a subject -

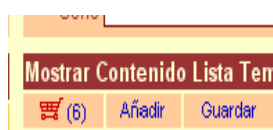
- Contenido / Content * - Seleccione un tema / Select a subject -

Agricultura / Agriculture
 Ciencia y tecnología / Science and technology
 Clasificaciones / Classifications
 Comercio / Trade
 Comercio electrónico y Sociedad de la Información / Ecommerce and Information Society
 Construcción, vivienda / Construction and housing
 Consultas técnicas al webmaster del INE / Technical requests to INE's webmaster
 Demografía, población / Demography, population
 Economía / Economy
 Educación, cultura y ocio / Education, culture, leisure

Enviar / Send

IX. HOW TO MAKE OUR USERS COMFORTABLE WHEN THEY VISIT OUR 'SUI GENERIS' RESTAURANT

16. Using well-known images that are normally used in other Internet-based environments. For example, using widespread icons like the shopping basket (to create a 'basket of series')...



or the wastepaper

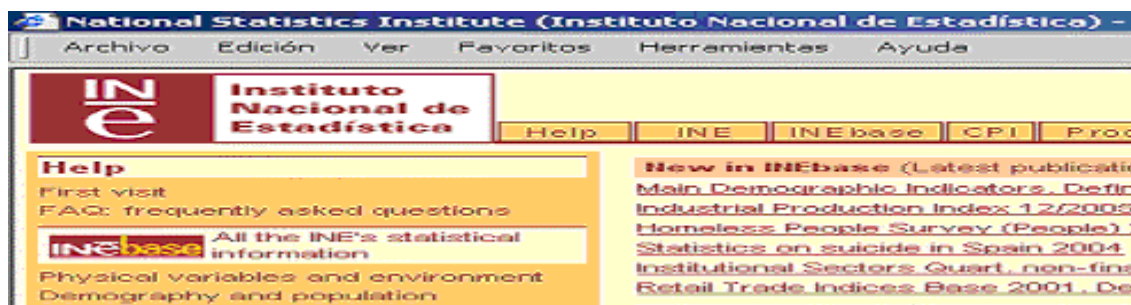


basket, to delete an item:

X. HOW TO LET OUR CUSTOMERS 'TASTE' OUR DISHES

17. We always try to consider at least two different types of customers, and create two types of 'menus.' On the one hand, we have those that use the two most widespread search engines (according to our logs): Explorer and Firefox (testing the compatibility with both applications)...

Explorer:



Firefox:



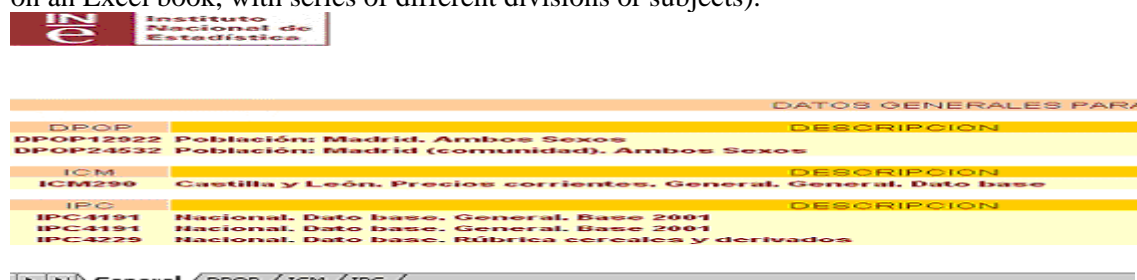
and on the other we also think some customers might use different types of products (Microsoft, Pc-Axis, or flat files, that are more or less structured).



XI. HOW TO INCREASE OUR CUSTOMERS' LOYALTY

18. It is important to use a careful presentation. Arranging each of our 'dishes,' when possible, to create an exquisite and meticulous appearance, since sometimes products (dishes or data) are 'devoured with the eyes' as the Spanish saying goes. In other words, it is essential to ensure that the information has an impeccable final appearance.

Example: A menu with different 'dishes' (in this case the index of a list of series, or 'basket,' downloaded on an Excel book, with series of different divisions or subjects).



DATOS GENERALES PARA	
DPOP	DESCRIPCION
DPOP12922	Población: Madrid. Ambos Sexos
DPOP24532	Población: Madrid (comunidad). Ambos Sexos
ICM	DESCRIPCION
ICM290	Castilla y León. Precios corrientes. General. General. Dato base
IPC	DESCRIPCION
IPC4191	Nacional. Dato base. General. Base 2001
IPC4191	Nacional. Dato base. General. Base 2001
IPC4229	Nacional. Dato base. Róbrica cereales y derivados

General / DPOP / ICM / IPC /

19. The subsequent spreadsheets of the Excel book downloaded present the data from the requested series:

Indices de Comercio al por menor. Base 2001 (ICM) - Castilla y León. Precios corrientes. General. General. Dato base

Información de la serie

Serie: ICM290	Periodicidad: Mensual			Segundad: 1		Unidades: Índices y tasas			Datos Provisionales: Si			
	Enero	Febrero	Marzo	Abril	Mayo	Junio	Julio	Agosto	Septiembre	Octubre	Noviembre	Diciembre
2002	105,113	89,857	99,39	101,699	108,059	103,113	113,372	107,902	102,019	108,523	104,185	124,659
2003	107,556	92,47	100,361	104,163	111,572	105,127	114,991	110,633	105,009	111,325	103,302	130,579
2004	114,703	99,107	106,894	110,386	111,725	113,252	121,8	114,982	108,953	115,258	110,74	136,748
2005	115,576	103,062	114,871	116,413	117,499	118,47	122,04	124,499	116,119			

General

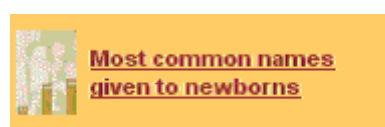
DPOP

ICM

IPC

XII. HOW TO MAKE OUR CUSTOMERS' VISITS MORE ENJOYABLE

20. Some parts of our site also include data that are less formal than the typical statistical information. For example, a list of the most common names given to newborns.



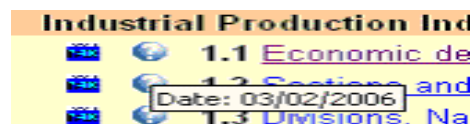
XIII. HOW TO PROVIDE OUR USERS WITH SUMMARISED INFORMATION FROM OTHER ORGANISMS

21. Our website also offers information from other 'Restaurants' that provide Spanish information with statistical purposes. For example the link <http://www.ine.es/fmiFrontEnd/fmi.jsp> shows this summary of national indicators:

late	% of active persons	Q4/05	8,70	8,42	3,34	-17,59	INE
Wages/earnings	Average monthly total wages: EUR	Q3/05	1.489,74	1.575,43	-5,4	1,9	INE
Consumer Price Index	2001 = 100	Dec/05	115,9	115,6	0,2	3,7	INE
Producer Prices Index	2001 = 100	Dec/05	114,7	114,7	0,0	5,2	INE
SCAL SECTOR							
IBS Data Category and Component	Unit Description	Date Period of latest Data	Latest data	Previous data	% Change from previous period to latest period	% Change from same period last year to latest period	More Info (links)
General Government operations							
Revenue	EUR Millions	2004	323.799	299.850	6,3	6,3	GAE
Expenditure	EUR Millions	2004	324.972	299.054	8,7	8,7	GAE
Balance	EUR Millions	2004	-1.173	204	...	...	GAE
Financing	EUR Millions	2004	1.296	375	...	...	GAE
Net acquisition of financial assets (-)	EUR Millions	2004	-17.294	-4.989	...	...	GAE
Net increase in liabilities	EUR Millions	2004	10.400	5.364	...	...	GAE

XIV. HOW TO PROVIDE INFORMATION ON THE 'EXPIRY DATE' OF OUR 'DISHES'

22. Linked to topic four of this meeting (control of versions), we use the icon '?' to provide additional information on the moment when the tables, that can be downloaded from the website, were published:



XV. FINAL SUMMARY

23. In summary, as I started out by saying, we use the creativity provided by a varied combination of persons and personalities, and very simple ideas that are sometimes very simple to implement, to improve our 'menu' and the attention provided at our 'Restaurant,' so that the data that are meticulously 'prepared' in our Computer department (not 'cooked,' mind!), reach our customers, as precisely as possible, hoping that they will return to visit us again at our special 'Restaurant' (website).

24. Quite a few of the ideas mentioned in this paper obviously stem from our experience as Internet users and therefore many of you may already be aware of them. On the other hand, others have been 'cooked up' by our team. In any case, we hope to have provided simple 'recipes' to increase the satisfaction and efficiency of the 'menus' of your respective 'restaurants,' which in this case are clearly not our competitors, but colleagues working in our same line of 'business.'

**UNITED NATIONS STATISTICAL COMMISSION and
ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS**

UNECE Work Session on Statistical Dissemination and Communication
(12-14 September 2006, Washington D.C., United States of America)

Topic (ii) Statistical literacy

**THE DIMENSIONS OF STATISTICAL LITERACY: CONCEPTUAL AND PRACTICAL
EVALUATIONS**

Invited Paper

Submitted by Statistics Finland¹

I. INTRODUCTION

1. Since the Second World War, statistical literacy has developed into an essential skill in a democratic society. Statistical information is used more and more because communities have grown, the market and global media pervade increasingly people's everyday lives, social networks are slackening, people are better educated to understand statistical information and technology makes it easy to produce statistical presentations. Given these circumstances statistical institutes rightly tend to want to present themselves as one component of the democratic process. However, compared to the volume of the flow of statistical information, people's capacity to receive and understand it seems inadequate. This means a problem for the producers of statistics. What can they do to increase the competence and ability to read statistics in society?

II. DIMENSIONS OF STATISTICAL LITERACY

2. A classic definition of statistical literacy was offered by Katherine Wallman in her presidential address at the meeting of the American Statistical Association in 1993: *Statistical literacy is the ability to understand and critically evaluate statistical results that permeate our daily lives - coupled with the ability to appreciate the contributions that statistical thinking can make in public and private, professional and personal decisions* (Wallman 1993). Wallman's definition still puts the emphasis on the crucial structure in which "understanding" must be coupled with the ability to critically evaluate data and appreciate what kinds of decisions can be based on them.

3. However, statistical literacy is a very multidimensional and complex talent. To analyse how to best promote it, statistical literacy has to be broken down to its basic elements. According to Gal (2002) statistical literacy has five knowledge and two dispositional elements. The knowledge elements are literacy skills, statistical knowledge, mathematical knowledge, context knowledge and critical questions. In simple terms the literacy skills mean the ability to read texts and documents and to combine different messages. Statistical knowledge means understanding the idea of variables and probability, and knowledge of the process of acquiring data. Mathematical knowledge comprises knowledge of basic mathematical concepts such as averages and the use of percentages. Context knowledge is knowledge of the preconditions of statistics, such as sources of errors. Critical skills mean the ability to question

¹ Prepared by Jussi Melkas, jussi.melkas@stat.fi.

statistical results. The dispositional aspects of statistical literacy are beliefs and attitudes, and critical stance. These dispositional elements build the inclination to activate the knowledge elements.

4. This presentation approaches statistical literacy from a somewhat different angle, although the contents of statistical literacy seem here to be about the same as Gal's. Compared to Gal's presentation we adopt a more practical way of thinking, which at the same time causes some loss of theoretical coherence. The presentation is based on the work done at Statistics Finland while developing customer training activities.

5. According to this work, statistical literacy consists of six components. The ability to search and find right and reliable statistics could be the seventh, but we exclude it from this discussion.

- **Social science concepts:** In order to understand and critically evaluate statistical reporting one has to master certain social science and economic concepts, such as inflation, unemployment rate and birth rate, for instance. The concepts are the heart of the measuring process, and dictate that what is being measured. If the reader has no knowledge of how statistical concepts differ from his everyday concepts, statistics cannot be properly understood and evaluated. One example of this is the debate that has gone on in many countries about the "right" measure of unemployment.
- **Statistical way of thinking:** The reader of statistics must understand the basic statistical elements, such as mean, variable and index. If you do not know how and why percentages are calculated, you will not get very much out of statistics. A critical reader of statistics also understands the difference between mean and median. Statistical reporting is full of different index figures that can have a direct practical impact on almost everybody's life. Landlords, tenants, pensioners or wage earners must accept the impact the cost of living index, for instance, has on their lives irrespective of whether they understand its calculation principles.
- **Presentation modes:** Statistical literacy requires interpretation of various types of presentations of statistical results, such as tabulations, graphics and verbal reporting. All presentation methods are full of conventions which the reader must be familiar with. Problems are most frequently encountered in connection with statistical graphics, but even the reading of a simple table is a fairly demanding task. Different ways of using words in reporting is important, too. Describing change in the unemployment rate with percentages and percentage points produces different results.
- **Research process:** Knowledge of the research process is also needed. In the media the process that has produced the results is often ignored as if the validity and reliability of the results could be taken for granted. It seems to be a basic hypothesis in the media that all samples are fully representative. However, a critical reader understands that no sample can tell an exact and nonbiased truth about the population. The reader must know what a good sample should be based on and how different aspects of data collecting can affect the results. For example, if the reader does not understand the effects that differences in the wordings of questionnaires can cause, he/she will end up confused by seemingly contradicting results.

6. In addition, the components of statistical literacy skills include:

- **Imagination:** One has to have the capacity to use critical imagination. This is something that the sociologist C. Wright Mills tried to define in the 1960s as sociological imagination. It is a capacity to see different statistical indicators as part of the same picture, to find connecting threads between different results. It is also a capacity to find different answers to statistical questions from those offered. It is a capacity to see behind the numbers. If you look at the third dimension of statistical literacy in Wallman's definition, it is just this skill it demands.

- **Carefulness:** Reading statistics requires a considerable amount of care. The competent reader of statistics always cross-checks - between rows and columns, between tables, figures and text, between one report and other reports, and between exception and rule.

III. PRACTICAL SOLUTIONS IN STATISTICS FINLAND'S TRAINING ACTIVITIES

7. There are two ways a producer of statistics can promote statistical literacy: 1) by educating people and 2) by making statistical results as easy to understand as possible. In the following I will concentrate on the former, but will also touch on the latter at the end of the presentation.

Statistical institutes cannot assume the sole responsibility for all advancement of statistical literacy in society. The main responsibility has to rest with the general school system and universities, but education systems seem to have had difficulties in teaching this subject. One reason is that the subject is so scattered over different disciplines, such as mathematics, history, geography, social sciences and macro and micro economic theory, philosophy, methodology, and so on. Another reason may be the traditional way in which statistics is taught, which makes it very difficult for students to understand. The breakdown of communication between the sciences and the humanities (the "two cultures" defined by C.P. Snow) still prevails in attitudes, too. Therefore, if they want their products to be understood, the producers of statistics must be prepared to provide at least some teaching in statistical literacy.

8. Statistics Finland uses two main channels for educating the users of statistics: charged courses of lectures and free teaching material published on the web (eCourse in Statistics). In addition, we organise a variety of meetings and seminars with diverse user groups, such as journalists and teachers. A more thorough presentation of Statistics Finland's educational activities can be found in the paper "Towards customer-oriented training at Statistics Finland"

(<http://www.unece.org/stats/documents/2006.06.ces.htm>).

Sample titles of Statistics Finland's courses on different components of statistical literacy

	Lecture courses	eCourse in Statistics
Social science concepts	Courses on topical themes, e.g. "Elderly people in Finland"	"Demographic and population statistics", "Labour market statistics", "National Accounts"
Statistical way of thinking	"Statistics for journalists"	"How to read and use statistics", "Introduction to statistical thinking", "Indices"
Presentation methods	"Statistical graphics"	"Statistical graphics", "Statistical maps"
Research process	"Survey process"	"Introduction to statistical thinking"
Imagination and carefulness	Exercises of multiple format courses	Exercises of different courses

9. According to the received feedback these activities have been quite successful, but they are not the ultimate solution to the promotion of statistical literacy. Lecturing is by definition restricted to very small audiences. The eCourse channel reaches a wider audience but the process of learning is at least partly uncontrolled. The users are mainly those already interested in statistics. Most of the people who really need to improve their statistical literacy skills never visit our website. In addition, there is a huge variety among the users of the web and it is difficult produce material to suit them all. Based on the feedback we can estimate that our eCourse is best suited for students at the upper secondary and higher levels of education. There is a clear need to develop more elementary contents and presentations for the needs of less educated people and students.

10. Although both channels aim towards education in all areas of statistical literacy, the main focus in the eCourse is on the basic concepts of social sciences and economics and this role seems to suit it quite

well. The lecturing seems to gain more students when its contents are of the methodological or practical kind. If the teaching is charged for, the basic concepts only seem to interest limited audiences. Exceptions to this are courses of lectures with heavily tailored contents for the needs of certain groups, such as professional communities or employers, or courses on specific current themes. (Many of the titles in the table relates to the lively debate that has arisen as the post-war baby boomers are approaching retirement age in Finland.)

11. Practical exercises are quite an important part of the process of learning statistical literacy. The eCourse includes a couple of exercises for each subject. We have also tried to organise so-called multiple format courses where the students are given some exercises to do as “homework” between lecture periods. The problem is that many students do not have the time or the patience to do these exercises. Perhaps the exercises should be made more interesting. The opportunities for interactive exercises in statistics should be increased, expressly in co-operation with educational institutes.

IV. TARGETING STATISTICAL LITERACY

12. The promoter of statistical literacy skills has to bear in mind a large variety of groups whose needs deviate from each other. The so-called audience of experts, in particular, is fragmented into small sub-groups, which calls for a strongly tailored approach in the devising of measures to improve their statistical literacy skills. I will next only concentrate on the upgrading of statistical literacy skills among **ordinary people**, because this is the most important area where education in statistical literacy is needed as far as the basic task of official statistics is concerned.

13. Looked at from a statistical institute, ordinary people are helplessly far away. Although the Internet has rapidly increased the possibilities for direct dialogue with them, there is a need for intermediaries who can pass on the skills. Because the intermediaries always give the information the context and adapt it according to their operating culture and interests, the producers of statistics must also have a strategy for the development of the operating cultures of these groups.

14. The group most often defined as the crucial one in efforts to reach ordinary people is **journalists** who pass on statistical information to the general public. However, from the point of universal improvement of statistical literacy a group that is even more important than journalists is **teachers** of educational institutes of different fields. The education system gives the basic skills for reading statistics while even at its best the media can only illustrate and expose problems in the interpretation of statistics – and, of course, themselves handle them professionally. A third group of experts that is important as far as ordinary people are concerned is that of economic and social scholars appearing in public. The weight of this group of “**intellectuals**” in determining the agenda of social debate has grown in step with the growth in the power of the media (at the cost of e.g. politicians).

15. I will now go on to elaborate on the hypothetical targets for the statistical literacy skills of the aforementioned four groups. The list was born in practical co-operation and is bound to need closer defining in a number of respects. Its aim is to demonstrate where the emphasis in the statistical literacy skills falls with each of these groups and how the producer of statistics must define his own role separately relative to each one of them.

A. Content of the statistical literacy of ordinary people

16. The demands imposed on the statistical literacy skills of ordinary people are actually not very great. It is quite sufficient if they can read the day’s newspaper or follow the statistical topics of a television news broadcast and understand them, evaluate them critically and draw conclusions from them. The required knowledge capital could, for example, consist of the following:

- knowing roughly the meaning of 20-30 key social science concepts that are used in statistics (inflation, gross domestic product, unemployment rate, etc.)
- understanding how key statistical parameters (per cent with its derivatives, mean, median) are calculated

- knowing how statistical data are collected and understanding procedures related to sampling methods
- being able to read tables and statistical graphics without the help of text.

17. **The basic method for reaching ordinary people is to present data in a mode that is as simple and illustrative as possible.** Irrespective of whether the information reaches them directly or indirectly, this supports the ability to interpret statistics best.

18. The Internet has rapidly become the main medium people use for searching statistical information. When Finnish people of working age were asked where they would go to look for statistics if they needed them, 56 per cent said the Internet. Nevertheless, the Internet is not an easy answer. Making statistics available on the web has generated a new audience for them but one that is also divided by level of education. People seldom enter statistical institutes' websites in order to improve their statistical literacy skills. In most cases, website visitors come via Google or a similar search engine, and mindful of the need of a specific piece of information – often without any interest in the methodological problems that may be associated with the information. Designing an efficient and illustrative set of web pages is one of the biggest challenges national statistical institutes and international statistical organisations face in the immediate future years. It must be possible to offer statistical information illustratively even to those who do not understand the finer points of statistical concept definitions, and tempt them to discover the preconditions and limits of the information.

B. Content of the statistical literacy of journalists

19. So that they could mediate statistical information understandably to ordinary people, journalists, naturally, have a broader need for information. They should also have the ability to foster an analytic attitude to statistics among the general public. They should:

- know the social science thinking behind the most important statistics, as well as around 100 key concepts on which statistics are based (current account deficit, dependency ratio, purchasing power parity, etc.)
- be able to calculate statistical parameter figures independently
- be capable of assessing and analysing what kinds of problems collected or published data may contain
- be able to compile tables and statistical graphics.

20. Journalists very seldom have the time to explore in depth the material they handle and instead of theoretic mastering of the topic it is more important for them to understand matters intuitively. **The possibility for interactive working is especially important in the development of journalistic work.** For this reason, web pages should contain examples to support the reading of statistics and personal consultation should be made available when questions arise. For instance, Statistics Finland regularly helps members of the media to evaluate the representativeness of data from diverse surveys. Courses designed for other experts suit journalists poorly, for the emphasis during their training events falls on discussion and examples.

C. Content of the statistical literacy of teachers

21. Because getting teaching of statistics included as a separate subject in official educational curricula is highly unlikely, co-operation with teachers of different subjects should be intensified. In addition to the teaching of history, social sciences, geography and mathematics, reading of statistics could also be introduced in practical content examinations, which is the prerequisite of real statistical literacy.

22. To be able to equip their students with adequate statistical literacy skills, the teachers of subjects with relevance to statistics must:

- know the social science thinking behind the most important statistics, as well as around 100 key concepts on which statistics are based (current account deficit, dependency ratio, purchasing power parity, etc.)
- know the principles of statistical science on which parameter figures are based
- know how statistical data are collected and understand sampling methodologies and their scientific bases
- be able to compile tables and statistical graphics, and understand the advantages and disadvantages of various presentation modes.

23. **Teachers need the support of a theoretical framework, on the one hand, and well-thought out practical exercises, on the other.** The theoretical framework provides the tools for reacting correctly in problem situations in teaching. The ready, pre-designed exercises, again, are necessary because it is not easy to spontaneously devise statistical exercises that would illustrate precisely the desired matter. To support lecturing, it is worthwhile to produce background teaching material from the perspectives of a variety of fields.

D. Content of the statistical literacy of "intellectuals"

24. The experts, or "intellectuals" who appear in public are a group that statistical institutes find difficult to approach as they do not like to be taught. Nevertheless, the group is important because it shapes public opinion – either in the direction that supports statistical literacy or towards total indifference about it. **The main pursuit of intellectuals is dialogue and a producer of statistics can best influence them by getting engaged in the dialogue.** Co-operation with this group can be enhanced by setting up common discussion forums (examples of this at Statistics Finland are the "Welfare Bulletin" and "Knowledge & Trends" periodicals, to which articles are written by both statistical experts and other producers of information on society) and by participation in social and scientific debate based on the statistical institute's own scientific repertoire. Statistics Finland has also found that collaboration in the processing of survey data is useful.

25. The content of the statistical literacy of "intellectuals" consists of:

- understanding of the role of statistical information alongside other forms of information, as well as of the principles and central concepts of statistical systems
- knowledge about the principles of processing observation data into statistics
- experience in the research process and an overall view of empirical research methods
- ability to compile tables and statistical graphics, and understand the advantages and disadvantages of various presentation modes.

26. A summary of the means Statistics Finland employs in its efforts to promote statistical literacy skills in society in general and in particular among the key population groups described above is attached hereto.

V. REFERENCES

- Gal, Iddo. Adult's Statistical Literacy: Meanings, Components, Responsibilities. *International Statistical Review*, 2002, 70, 1.
- Mills, C. Wright. *The Sociological Imagination*. New York. Oxford University Press, 1976 (original title 1959).
- Snow, C. P. *The Two Cultures*. Cambridge University Press, 1993 (original lecture 1959).
- Statistics Finland. "Towards customer-oriented training at Statistics Finland". Paper presented at CES Plenary Meeting Paris 13-15 June 2006. <http://www.unece.org/stats/documents/2006.06.ces.htm>
- Wallman, Katherine K. Enhancing Statistical Literacy: Enriching Our Society. *Journal of the American Statistical Association* March 1993, Vol. 88, No. 421.

Statistics Finland's measures to support statistical literacy skills in various target groups

	Ordinary people	Journalists	Teachers (own home page on Internet website)	"Intellectuals"
Social science and economic concepts	Logical and easy search function on the Internet Links from statistical data to concept definitions in plain language	Databank of concepts accessible via the Internet Courses and days on topical themes for groups of journalists	Databank of concepts accessible via the Internet Ready teaching material produced in co-operation with educational institutes	Databank of concepts accessible via the Internet Possibility to participate in the analyses of Statistics Finland's data Possibility to write articles for Statistics Finland's periodicals (Welfare Bulletin, Knowledge & Trends, etc.)
Basic statistical thinking	Module of How to Read and Use Statistics of the eCourse in Statistics	Course of lectures on statistics for journalists	Tailored courses for diverse groups of teachers Ready teaching material produced in co-operation with educational institutes	Methodological seminars on various statistical topics
Research process	Methodological descriptions in plain language on the Internet	Course of lectures on statistics for journalists Methodological descriptions on the Internet	Course on the survey process and its material on the Internet	Articles in Statistics Finland's publications
Presentation modes	Clarity of statistical graphics and tables on the Internet	Course of lectures on statistical graphics	Course of lectures and lesson of the eCourse on statistical graphics	Course of lectures on statistical graphics
Imagination and carefulness in the reading of statistics	Exercises and quizzes on the Internet for those willing to learn	Statistical support service for journalists	Ready exercises complete with answers on the Internet	Provision of forums for dialogue in Statistics Finland's publications

**UNITED NATIONS STATISTICAL COMMISSION and
ECONOMIC COMMISSION FOR EUROPE
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UNECE Work Session on Statistical Dissemination and Communication
(12-14 September 2006, Washington D.C., United States of America)

Topic (ii) Statistical literacy

COMMUNICATION AND PERCEPTION: WHICH WORLD DO STATISTICS LIVE IN?

Invited Paper

Submitted by Federal Statistical Office Germany¹

I. INTRODUCTION

1. How does the general public perceive our statistical figures? How do people react to statistical information which is contrary to their expectations? To what extent are individuals able to distinguish between averaged data and the observations they make in their own personal environment? The author claims that the public perception plays a major role in the successful communication of statistical results – a role which is broadly underestimated in Official Statistics. The importance of public perception has often been neglected in Official Statistics. This can seriously harm the credibility of a National Statistical Agency. In the paper, the aspect of perception is examined using several examples from social statistics as well as statistics of prices, income, retail trade and labour force.

2. What conclusion are we to draw? Important aspects of the quality issue are relevance and coherence. If we want to take these aspects into account, then we have to rely on what the recipients actually receive – and not on what we are sending them. The users do not perceive our statistical results as isolated facts. They will always tend to translate the statistical findings into their personal context and to check whether the figures match their own experiences and expectations. Is it really a match or sometimes more a case of mismatch? Should we leave our users alone with their “cognitive dissonance” or should we help them to dissolve it? It would appear crucial for Statistical Agencies to gather more knowledge on phenomena such as public perception, possibly in cooperation with research institutes or universities. In this paper, as an example, the author presents the results of a very challenging cooperation with Prof Brachinger from the University of Fribourg.

3. How do we communicate? The process can be regarded as a triangular relationship between the Statistician, the users and the media. The press, television and other media are the main sources of information for most of our users on their social and political environment. The media creates a context that we have to account for if we want to reach our recipients. Our figures are relevant, if the users are able to interrelate them to the other things they hear in the media. Our figures should be “policy relevant”, but not “policy driven”. They should clearly relate to other information reaching the recipient – without being biased or judgemental. On the other hand, the media is vital for Official Statistics in order to improve the communication with the public. Using powerful information channels, a gap between public perception and statistical findings can be dissolved by explaining possible reasons for discrepancies. If this is done early enough, possible credibility crises can be avoided. Risk management should be a part of our communication strategy.

¹ Prepared by Sibylle von Oppeln-Bronikowski, sibylle.oppeln@destatis.de

II. PERCEPTION OF STATISTICAL RESULTS

4. In May 2005 the Federal Statistical Office Germany (Destatis) was challenged by headlines in two newspapers – the well known and widely read BILD, a yellow press paper, wrote: “What about you? Do YOU have a net income of 3753 Euros, too? How federal statisticians calculate to make families appear rich”. The “Hamburger Abendblatt” captioned an article: “Look how the Federal Statistical Office calculates. Families have a net income of more than 3700 Euros!” What had caused the public outcry? The day before we had launched a press release entitled: “Monthly net income of families just above EUR 3,700 on average.” In the text family was defined as couples with children younger than 18. The public reacted instantly and our office received hundreds of telephone calls. The comments were not always friendly. We could say: O.K., that’s life, we cannot please everybody. Our calculations are correct. We are statisticians. We supply objective figures. We are safe as long as we do not stray from the path of virtue...

5. But how do you define the truth? Does an average income reflect reality? To what extent are we responsible for the perception or misperception of statistical results? It is important for statisticians to take dissenting perceptions seriously. First of all we need knowledge about the essence of perception. A simple definition might suffice for the moment: In psychology and the cognitive sciences, it is defined as the process of acquiring, interpreting, selecting and organizing sensory information. Whenever a receptor gains information that does not suit his/her personal experience it is filtered out or produces resistance. In this context I would like to quote a German economist and philosopher, Hans Albert, who emphasized the role of cognitive factors in the explanation of economic and social processes: “The strict delimitation from psychological theories has proved to be a hindrance to the progress of economic thinking... thus it is absolutely legitimate if economists, in order to explain economic and social processes, rely on behavioural theory to have a solid foundation taking cognitive factors into account.” Another professor of economics, Ernst Fehr from Switzerland, even claims that we have to discard the *homo oeconomicus* concept: “Economists are frequently mistaken in their forecasts, because traditional economics does not care about people’s emotions and concrete goals.”

III. EMOTIONS – A POTENTIAL RISK WHEN INTERPRETING DATA

6. To what degree are statistics affected by emotional factors? To what extent can statistical results provoke public anger? Official statistics is confronted with topics which are more rationally perceived such as average temperatures as well as with emotional topics such as bird flue or unhealthy food. As far as the more emotionally charged issues are concerned, we can ascertain that they are taken very seriously by political decision makers. For instance, in Germany a Federal Institute for Risk Assessment was recently established. Last Year a Conference was held in Berlin entitled “What does a crisis cost”.

7. In Germany as in many other European countries, the National Statistical Office came under public attack after the Introduction of the Euro notes and coins in January 2002. The Euro was subsequently given the nick-name TEURO which loosely translated means “expenso”, demonstrating that the general public perceived a sharp increase in prices. This perception however was generally not supported by the official Consumer Price Index (CPI). The CPI indicated a fairly moderate annual increase of 2.0 percent on average. Destatis was not really prepared for this debate and to an extent our communication failed in the initial phase. In the following process we were then forced to learn about perception in order not to lose our credibility. It was crucial to find the right balance and gain key partners from the scientific and media sector.

8. To gather more knowledge about public perception especially as far as perception of inflation is concerned, Destatis started a challenging cooperation with Prof. Brachinger from the University of Fribourg Switzerland. Starting from fundamental psychological insights over human perception, Brachinger (see Brachinger 2005, 2006) had developed a theory of inflation perception helping statisticians to understand the gap between the official CPI and perceived inflation in Germany. The main idea of this theory is that, with respect to a certain reference price, price increases are seen as losses and price decreases as gains. People experience losses to a greater extent than gains or stable developments (so called loss aversion), and they experience losses even more strongly if they are confronted with them on a regular basis. On the basis of this theory, to measure perceived inflation, Brachinger proposed a perceived inflation index (“IPI”). This index has been calculated and lead to a very surprising result: The

IPI rose sharply one year prior to Euro cash introduction. In January 2002 the perceived inflation reached more than 10.6% compared to the official CPI of 2.0%.

IV. CAN STATISTICS DESCRIBE REALITY?

9. A further headline in a serious newspaper questioned our credibility in October 2005: “The myth of German thrift”. A Destatis press release about monthly savings had led to misunderstandings and irritation. The headline of the press release said that German households save 160 € per month on average. The arithmetical mean however is very misleading! Unlike body size, the margins between poorer and richer households vary considerably. In general, a lot of thought needs to go into the dissemination of data on income, expenses, sales of large and small firms, earnings etc.. In his first lesson for young statisticians the highly esteemed Prof. Wagenführ said: “Be careful when calculating mean values! They can be very misleading. As statisticians we have a large responsibility to use them appropriately.” In certain cases mean values are a great help. For instance, it is very useful for office chair producers to know that the average size of office workers is 172 cm and to have an idea of the variance. But the mean value is not suitable for many other things we want to measure. I am convinced that this realisation should have a greater impact on our work in official statistics.

10. Another interesting question is how statisticians describe results in official publications, in press releases or on the Internet. Sometimes it seems as if written texts are tables. Percentages and averages are presented without any background information being provided or stories being told! More attention is paid to the super-correctness of the figures. Precise percentages with two decimal places evoke an “illusion of truth and certainty”. But like a rose cannot be sufficiently described by its measured length – without reference to colour and perfume – statistical results are more easily understood in a context that takes a multifaceted reality into account. Visual means can help to understand results and we should opt for more innovative illustrations such as box plots. In order to visualise statistical results containing large divergences, such as the production in different regions, a mean value can be presented whilst also illustrating the range from the region with the lowest and the region with the highest production level.

V. COMMUNICATION OF STATISTICAL RESULTS

11. Why are we reflecting on how statistics are perceived? Because we want to be understood! But how can we establish whether we are being understood correctly? This is where communication sets in. Similarly to the very common physics experiment called the Newton’s cradle or “tik-tok” we want information to come in as we send it out. Communication comes from the Latin word *communicare* which means to share or to interact. This interaction can occur both directly or indirectly.

12. For us, the statistical publications are our main communication channel - especially those presented on our website. Indirect lines of communication are the mass media and politics. All three lines have advantages but also entail the risk of misinterpretation. The risk of the direct line is our specific statistical language and the lack of sufficient and understandable metadata. In this case, information services at a high quality level can help to identify and to close the gap between sender and recipient. Mass media are important as they make statistical results known to the public, but they have their own interests and often tend to publish bad news rather than good news. Active press offices work closely with the press, which is a major communication line. Politicians like to use statistics if they are useful for them – which can lead to misuse of data. In Germany our office installed a special information service unit for key clients in the German capital. This service caters for Members of Parliament, all federal ministries and other key users in Berlin such as consulates. The office is located in the German parliament and provides a rapid response service that caters to the needs of this specific client group.

VI. SUMMARY

13. Summarizing, I quote a well known statistical capacity, Mr. Fellegi from Statistics Canada, who pinpointed why we pay attention to perception: “Credibility is a matter of perception. It should be seen institutionally and technically. Most important is our concern about the product. This touches our values. A good reputation is easy to loose, but very difficult to establish.”

14. The main issues on our way to a high quality profile are well known and widely accepted. The focus in respect to good communication – in my opinion – should be placed on quality reports, subject-

related and comprehensive responsibilities, independence from political influence and an increase in methodological expertise by involving interdisciplinary science.

VII. REFERENCES

Albert, Hans, as quoted in: “Ökonomen im psychologischen Vakuum“, Frankfurter Allgemeine Zeitung, 30.9.2005, p. 14, quote translated by the author

Brachinger, Hans Wolfgang (2005), “Der Euro als Teuro?“, in *Wirtschaft und Statistik* 9/2005, pp. 999 – 1013

Brachinger, Hans Wolfgang (2006), „Euro or 'Teuro'? The Euro-induced Perceived Inflation in Germany, Department of Quantitative Economics Working Paper No 5; University of Fribourg Switzerland URL <http://ideas.repec.org/p/fri/dqewps/wp0005.html>

Fehr, Ernst, as quoted in: Malte Fischer: “Ins Schwarze treffen. Mit neuen Methoden der Gehirnforschung erkunden Ökonomen die Grundlagen menschlichen Verhaltens – und stellen die Wirtschaftstheorie in Frage“, *Wirtschaftswoche*, 28.7.2005, pp. 69 – 71, quote translated by the author

Fellegi, Ivan (2004), “Maintaining the credibility of official statistics”, in *Statistical Journal of the United Nations* ECE 21, pp. 191-198, IOS Press

Öchsner, Thomas (2005), “Die deutsche Sparlüge“, in *Süddeutsche Zeitung*, 28.10.2005, p. 19

Wagenführ, Rolf (1971), “Statistik leicht gemacht, Band I“, pp. 86 et sqq., Köln: Bund-Verlag, quote translated by the author

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Topic (ii) Statistical literacy

DEVELOPING STATISTICAL LITERACY IN THE CASE OF MACEDONIA

Supporting Paper

Submitted by State Statistical Office of Macedonia, Republic of Macedonia¹

I. INTRODUCTION

1. In our modern, knowledge-based society and economy, the population is confronted with figures on a daily basis. Modern technology gives easy access to a huge amount of data, and data are everywhere. In these circumstances, data providers should change their approach of how to make real data accessible to users. It is important that citizens are able to take these ever-present data, understand what is being presented, and use them appropriately for real life, decision-making applications.

2. Modern technology makes new challenges for statistical offices: there is a need to disseminate our statistics in various forms and communicate at many different levels with our users. It seems that in order to make statistics easier to understand and use, it is of primary importance to educate users on how to use statistics, and secondly, to make statistical services easy to access and understand.

3. The process of transition of Macedonian economy and society was reflected in the statistical system of the State. The State Statistical Office of Macedonia (SSOM), as the main actor in statistics, was involved in this process in two mainstreams: (1) statistics should record, by relevant statistical methods, changes in Macedonian economy; and (2) national statistics should be transformed and adjusted to statistics in market societies. In order to achieve the first objective, SSOM emphasized transformation of its production process, including study and application of new methodologies. The second priority was the work on data dissemination and educating the public on statistics.

4. This paper describes the activities completed so far, our achievements and the challenges for the educational activities of the SSOM, to achieve a wide use of statistics and educating public about statistics.

II. STATISTICAL LITERACY ACTIONS

A. User orientation as the first step for building statistical literacy

5. The State Statistical Office of Macedonia, in 1999, adopted the its first Dissemination Strategy for the period 2000-2005. As stated in this strategy, user oriented production of statistics and communication with data users was the focus. In order to develop user-oriented statistics, the first step was to produce statistics that are easy to understand. The starting point was:

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- Improving the layout and content of tables (to be easy to understand) in all cross-subject statistical publications
- Unique approach (as template), and short explanations to statisticians, for writing the methodological explanations in publications
- Starting activities on design and application of statistical terminology in Macedonian language in CODED 2000
- Co-operation with the educational sector

6. The main characteristic of statistical publications was very long tables, each detailing many economic or social characteristics, a feature making them difficult to understand by non-statistical users. Therefore, the process for redesign of statistical tables was started. The people in our dissemination sector started this process with cross-subject statistical publications (like our Statistical yearbook), explaining the idea for redesign of tables to statisticians and drafting templates for new tables. In the first two years we had difficulty convincing some statisticians about the need to redesign the tables, but this process has proved its worth and nowadays some of the statisticians ask us for ideas to improve the tables in their subject-matter publications. Their main reason for accepting this idea after some time was the decrease in questions by dissemination staff or users.

7. Encouraged by these positive results, a new conceptual and editing layout for our News Releases was defined at the beginning of this 2006. Due to some human resources constraints, the implementation of this idea is postponed until 2007. The main improvement in conceptual design of this edition is changing writing style from pure presentations of facts with short textual explanations, to storytelling about the relevant subject and statistical interpretation of data.

B. Unique approach in presenting methodological explanations

8. The next step in this work to improve the usability of statistical publications was the work on wording for methodological explanations. The SSOM, like other statistical institutions, included in all publications a set of methodological explanations linked to the subject of the publication. When we checked the methodological explanations in our publications, we noticed a large difference in presentation of methodology. Different writing styles were noted, and the choice of different aspects of methodology to be explained across different publications. Therefore, the employees in the dissemination sector, in co-operation with methodological experts, drafted the template for writing methodological explanations, providing guidelines and examples on how to write them. This was successfully implemented for all cross-subject publications, but was not completely followed for subject-specific publications. The main reason for this was the human factor, and different understanding by employees about the importance of this action. In the near future, the SSOM, in co-operation with Statistics Sweden (through the SIDA Fund²), will commence a project on establishing metadata in SSOM, and it is expected that the work on standard methodological explanations will be included within this project and later transmitted in data dissemination.

9. Changes in the method for presentation of methodological explanations have a positive impact on improving and understanding statistical numbers. We have an increasing number of users who not only read, but are also willing to discuss with us many specific methodological issues. Our work with journalists to read not only numbers, but also methodological explanations, had the result that many are willing to include explanations as comments in their text.

10. However, the work on dissemination of methodological explanations is not finished. This should be seen only as starting point in educating users on statistical methodology. There is also a need to expand activities to increase statistical knowledge across different user groups. The SSOM should make efforts to organise training in specific statistical areas with relevant user groups, the first priority being governmental officials.

² SIDA is the Swedish International Development Cooperation Agency. The SSOM has benefited from their development assistance in several areas.

C. CODED 2000³

11. A few years ago, within the National PHARE Project -SOP 98⁴, the work on establishing statistical terminology in the Macedonian language was started. The following topics were included in the project: labour market, external trade, national accounts, and business statistics. This activity was done using EUROSTAT's CODED Database, version 2000.

12. Staff recognised that establishing statistical terminology is a long-term process that should be done in co-operation with proofreading experts in the Macedonian language. The main problem was the difficulty in establishing statistical definitions for those characteristics that differ between departments. It was also problematic to harmonise definitions according to CODED standards. In order to partially solve this issue, we decided to use two definitions with notes for some statistical terms.

13. After finishing this project, this activity was discontinued due to some other priorities, such as the Population Census in 2002. However, this year, our proof-readers and some of our statistical experts expressed their interest to continue with this action, considering this work very useful not only for users, but also for statisticians. We are now discussing a change in the organisation of this work in order to get more acceptance from staff and to develop technical support through our Intranet. With these initiatives, we have to re-check the work done, and develop a work plan to achieve our goals, to make this terminology available to our users.

III. EDUCATION SECTOR

D. Experience in the work with students

14. The majority of students studying statistics are taking a "servicing" course in preparation for a career where statistics will be a professional tool rather than a central skill. Such students come from a wide variety of disciplines: law, economics, social sciences, etc. Most of these students are learning statistics from a theoretical view and they have a lack of practical experience in statistical explorations. For that reason, we have discussed with faculties the need to create more case studies on statistics in which the SSOM will be involved.

15. This idea has been implemented in several ways. Some students are given more topics on statistics for their seminar works, and they work and communicate with us while preparing these studies. One private university took the initiative to encourage students to have practical experience working in our office. This is a very good approach and the SSOM welcomed the placement of young students in the premises of our institution, enabling them to build on their theoretical understanding of official statistics. This should be implemented as a standard practice with other university faculties. It is clear that the process for educating students about statistics will start with teachers, and there is a need for the SSOM to invest more money and time to make official statistics more familiar to teachers as well as students.

IV. SUMMARY

16. In preparing this paper I tried to present the activities undertaken by the SSOM in recent years to improve statistical literacy. However, all of these activities are in the early phases, and there is a need for more action. When we talk about statistical literacy, we should not forget that literacy has a direct impact on the image of the statistical institution. If an institution is willing to improve its credibility in with the public, then the starting point is to invest more money on educating the public about statistics.

17. The actions undertaken in the past, and the results achieved, encourage us to continue this work with confidence that further results will be visible for some years.

³ CODED is a EUROSTAT developed tool used for statistical terminology as well as for metadata purposes.

⁴ National PHARE Project, funded by the European Union, comprised technical assistance and equipment for building institutional capacity of the SSOM.

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UNECE Work Session on Statistical Dissemination and Communication
(12-14 September 2006, Washington D.C., United States of America)

Topic (ii) Statistical literacy

NEWS RELEASES PUBLISHED ON SPECIAL OCCASIONS

Supporting Paper

Submitted by the Statistical Office of the Republic of Slovenia¹

I. INTRODUCTION

1. A vigorous democracy demands substantial official statistics. They are, beyond a doubt, urgently needed and widely useful for all current, high profile target audiences. However, statistics can also be used exclusively as a promotional tool among the general public while drawing attention to and providing valuable information about people's lives.
2. Objective and politically independent statistics can be an accurate mirror of society, although for discovering facts and figures in huge treasury of statistics, simple and interesting research tools have to be available to users, i.e. news releases.
3. Electronic dissemination is currently the primary postulate for exposure and a good challenge for the statistical office to establish advanced communication with different audiences, yet the media still plays perhaps the most important role.
4. The Slovenian Statistical Office for effective communication with public via media publishes news release at special occasions: when a country-wide event is taking place, e.g. holidays, national or international days, which are devoted to a specific group of people or to some activity, phenomena or appearance.
5. Press-clipping reviews for the first two releases in 2005 showed astonishingly good results, but all the same, quite vivid debate was evoked in the Slovenian Statistical Office about whether or not too much of our professional-statistical approach had been lost in the simplified texts of the press releases.

II. MEDIA AS TRANSMITTERS AND AUDIENCE

6. Apart from the important roles of official statistics as a substantial basis for a true democratic society, in decision-making processes and for the public as the arbiter of the Government's administration, statistics in themselves can and should be used as a promotional tool in the general public while offering some information to the broad audience concerning their lives or for attracting almost everyone's attention to certain details.

¹ Prepared by Ida Repovz Grabnar, Public Relations (ida.repovz-grabnar@gov.si).

7. Development of information technology in one way determines the tempo and mode of the statistical office's work, but not least does it offer an unlimited scale of opportunities to disseminate on-line statistical data and information to a vast number of users at the same moment. We might say that the 6th principle of the European Statistics Code of Practice, i.e. "all users are treated equitably", with the development of ICT can be fulfilled. Nevertheless, electronic dissemination is not only the first postulate and a good challenge for an advanced statistical office, the internet and well-organised web sites can facilitate users to find data and information with ease; we might presume that many expectations of users can be richly met. A "users' satisfaction survey" should confirm or disprove such a prevision.

8. Classifications of targeted users and dissemination channels have been precisely investigated by many statistical agencies in previous years; perhaps not much more can be added. It is a fact known to us all that the media plays perhaps the most important part: they are the "watchdogs" of democracy, they judge the work of the statistical office (i.e. its transparency of statistical process, integrity and independence) as well, and at the same time they are the transmitters of statistical information, especially to the general public. However, they take from us pertinent, up-to-date, important, interesting statistics or shocking information only.

9. The first principle of the Code of Ethics of Slovenian Journalists states that the right of the public to be informed and the right of the journalists to express their opinions can be implemented by free gathering, disseminating and transmitting information. Because of this double role of journalists, i.e. being censors of the state institution's behaviour with strong power in creating public opinion and also for simple human beings possessing limited educational background in statistics, special care in maintaining professional and open relationships with journalists is needed. The media thus can be, in a way, the most effective channel for dissemination of statistics to ordinary people.

10. Statisticians often do not anticipate that users of statistics, including journalists, lack the ability to understand statistical terminology and concepts of methodologies that accompany statistical data. Statistical thinking, which includes statistical data, data-related arguments and all kinds of statistical measures for describing the relationship between variables, is not supposed to be self-evident in the common approach of reading statistical data among ordinary users; researchers and economic analysts are certainly the exceptions. Can we say that journalists are statistically illiterate? Scarcely, reasons for publishing press releases are well-known and were documented in published manuals years ago.

11. The intention of the statistical agency is evident: user-oriented statistics are expected to be useful, widely appreciated, understandable, easy and interesting for the general public, therefore the description of "real life" would broaden the knowledge of us. Then objective and politically independent statistics is to become the mirror of the society, in which everybody can discover facts and figures about ourselves in simple and understandable sentences:

- for the general public, including media, but only if there is substantial trust in official statistics, and
- for politicians who, not so rarely, anticipate statistical output with anxiety and discomfort.

12. Despite an enormous amount of information structured in well-known fields of statistics, the usefulness of that information in abundant cyberspace on the internet is not always clear. Do we have the right to expect average users (students, researchers, economists cannot be left out) to understand the information which a statistician presents only in mathematical terms: in table, chart, percentage point, index, coefficient etc.? Should we not make the first move in publishing comprehensible texts which accompany statistical data instead of our demand that the public and journalists master substantial literacy? It is our duty to make it easier to understand and to translate, out of regard for the truth, from professional statistical language into common language.

III. SLOVENIAN NEWS RELEASES AT SPECIAL OCCASIONS

13. The Slovenian Statistical Office for effective communication with the public, via the media, publishes news releases, not only when the results of statistical surveys are prepared, but also offer an occasional release when it is assumed that some extra statistical information would be highly appreciated by the media and the public. Nevertheless, such a release covers more fields of statistics, avoiding a purely statistical-numerical approach, and provides soft, easy to understand, summarized information on the selected subject.

14. Journalists are looking for statistics whenever they want to corroborate their assumptions or just illustrate issues in articles. Sometimes press officers and statisticians as well can “predict” their needs in view of our own experiences in the past, and publish news releases for such, let us say, special occasions when something in the country is taking place, e.g. at holidays, for national or international days which are devoted to a specific group of people or some activity, phenomena or appearance.

15. In the Slovenian Statistical Office two occasional news releases were prepared last year for the first time: for international women’s day and mother’s day. After having published them on the web, the press releases were sent by e-mail to a vast number of journalists in different media: newspapers, radio, as well as electronic media and internet sources. In both cases, press-clippings brought astonishingly good results. Soon afterwards, quite lively debate was evoked in the statistical office over whether or not the texts in press releases were too simplified and if they were not “professionally statistical” enough. Nevertheless, publicity was so welcome in the Statistical Office that it was decided to launch similar news releases for the remaining “red-letter” days and holidays. In 2006 there will be around 26 releases for national and international days like Earth Day, World Communication Day, Internationally Family Day, National Farm Women Day, World Day of Post, World Truism Day, National Mountaineering Day, National Day of Culture, International Day of Older Persons etc.

16. Measuring the usefulness and popularity of those news releases, i.e. our efforts in communication with journalists, indicated that we made the right choice generally speaking. However, in some cases we should incorporate more fresh data (unfortunately not available at the time) and interpret in a more broad aspect by including even more different statistical fields in one release. But for some releases, there was no perceived interest, because we actually missed the content. For example, in a release for World Environment Day, in which we wrote about lack of water, the media was mostly interested in air quality. Those releases were and still are mostly used by journalists as supplementary sources in their articles, but often the whole release can be published. We have noticed lately that releases are perhaps the most popular among radio journalists who use the contents for connecting short messages between music and serious broadcastings.

17. Writing news releases at special occasions involves the statistician and public relations officer. For both of them indispensable patience is required to achieve an end in which the compromised result for stakeholders (statistician, PR-officer) and audiences (media, public) can be more or less satisfied. As those releases are written for the web, fundamental principles for writing on the web are rather taken into account; however there is still room for improvement. We should admit frankly: this is not an easy task for statisticians, yet they are rewarded with satisfaction and self-promotion afterwards. The author of such a release is exposed for further explanations or more detailed statistics and, for that very reason, preparing a release gives much pleasure to statisticians.

18. When a news release is published on the web, e-mails to journalists are sent with a very short introduction to the release and the link to its web site, where the news release is published. Sometimes, part of or the entire release is published in the media, otherwise a journalist asks for an interview with the statistician.

19. The structure of special news releases is now more or less fixed: the title should tell the purpose of the release followed by a short summary of no more than two sentences; it includes content with subheadings, without methodological explanations or notes, written in simplified language, no table and perhaps one graph; these releases are not always bilingual.

20. The purpose of publishing those news releases is manifested in the Slovenian Statistical Office by at least a two-fold aim:

- promotion of official statistics among the general public via media while enhancing good relationship with journalists, and
- encouraging statisticians to write commentaries to statistical data in a more easily understood and pleasing way.

21. Media responses to special news releases are most frequently significantly positive. In the past year, journalists have become accustomed to them, sometimes even asking us for the release before the certain devoted day is to take place. We may conclude that journalists are satisfied with our approach; moreover, they judge the Slovenian Statistical Office, in a sense, as a sufficiently open institution.

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TAKING A HORSE TO WATER – AND GIVING IT A BOTTLE

Invited Paper

Submitted by Office for National Statistics, United Kingdom¹

I. INTRODUCTION

1. A curious title, you might think. But let it paint a picture in your mind. We've all heard the saying that you can 'take a horse to water, but you can't make it drink'; well imagine leading your horse along and then giving it water in a bottle, which to most horses is useless.
2. Apply this analogy to some attempts to communicate statistics to the public. We have the information they want and we show them where it is but then we contrive to make it difficult for the user to make the most of; or, worse, lead them to misuse it.
3. A common reaction then is to blame the user for their inability to make sense of something which to most of us is quite straightforward. To use that picture again, we humans manage fine with a bottle of water, why can't the stupid horse?
4. Without doubt, internet and other electronic systems have created unprecedented access to statistical data and in many countries it is completely free. The delivery systems are generally good and well understood. But still we fret at the way data are often used. The fact is that good data and good delivery systems simply are not enough. We are falling at the final fence. The 'bottle' we are giving our 'horse' is the language and methods with which we try to communicate our statistics.

II. IDENTIFYING THE STATISTICAL GULF

5. The problem is the gulf in understanding between many statisticians and much of the wider community including many people who use statistics in their daily working lives such as politicians, lobbyists, students and journalists. There is a lack of 'statistical literacy' in the general public.
6. Many statisticians find this frustrating and fret at the stupidity of people who deliberately or unwittingly draw wrong conclusions from their statistics. There are two reasonable courses of action:
 - Substantial programmes to make people 'statistically literate'.
 - Or, present more easily understandable material to the public, and, as a result, reduce the opportunity for misunderstanding and misinterpretation.

¹ Prepared by David Marder (david.marder@ons.gsi.gov.uk) Views expressed are personal and to stimulate discussion; they do not necessarily represent policy of ONS.

7. The answer almost certainly lies with a combination of the two but are either realistically achievable? Mass statistical education has been on the agenda for generations but only makes a small dent on lack of public understanding. If we can assume only the most basic of statistical literacy in the public, what more can producers and communicators of the statistics do to bridge the gulf? Secondly, we must remember ‘statistical literacy’ is something different from being brilliant with the numbers; so what is it?

A. What is ‘statistical literacy’?

- a. Defining ‘statistical literacy’ is not simple. Firstly, I’ll draw from Iddo Gal who in 2002 wrote² *“Statistical literacy is a key ability expected of citizens in information-laden societies, and is often touted as an expected outcome of schooling and as a necessary component of adults’ numeracy and literacy. Yet its meaning and building blocks have received little explicit attention. . . . Statistical literacy is the ability to interpret, critically evaluate, and communicate about statistical information and messages.”*
- b. It is clear that ‘statistical literacy’ is different from ‘being good at doing statistics’. Another eminent statistics teacher, Milo Schield suggests, *“Statistical literacy focuses on making decisions using statistics as evidence just as reading literacy focuses on using words as evidence. Statistical literacy is a competency just like reading, writing or speaking.”*
- c. So you can be ‘statistically literate’ without having a deep understanding of how to prepare and produce statistics. However, you can’t be ‘statistically literate’ without at least having some degree of numeracy and interpretative ability. Can the converse apply? Is it possible to be ‘statistically illiterate’ while still having a deep understanding of the processes of producing statistics? I’ll let this question lie.
- d. As we all know, a little knowledge can sometimes be a dangerous thing and there are many people who would say they are confident of their statistical understanding who still make a hash when they try to use them – policy-makers and journalists among them.
- e. Evidence-based policy is a mantra of many governments. Talking on the subject David Halpern of the UK Prime Minister’s Strategy Office said: *“Statistical literacy would be nice. It is not that widespread and is a serious limitation, not just in terms of being able to interpret a logistic progression but also being able to understand a mindset of a whole body of work.”*
- f. Past president of the Royal Statistical Society (RSS), Professor Andy Grieve, said at the time of the General Election in the UK during 2005: *“Anyone living in the UK in April 2005 cannot fail to appreciate the need for statistical literacy. The election campaigns of the major political parties are dominated by argument and counter argument based on statistics. Voters should be able to understand both good and bad uses of statistics.”*
- g. He was speaking at the production of a report urging greater importance for statistics within the school curriculum to help students gain an appropriate level of statistical literacy. The RSS Working Group prepared a detailed report with far-reaching recommendations for UK schools’ core curriculum for 14-19 year olds. It said: *“An understanding of statistical literacy should form a part of the common educational entitlement for every school pupil.”*

III HOW WE EDUCATE THE YOUNG

9. So we can say ‘statistical literacy’ is a ‘good thing’. It is an educational entitlement; it is essential for democracy to work; and it is vital for producing and understanding evidence-based policy.

10. At ONS we have taken a proactive position in trying to help schools and colleges in their effort to improve statistical literacy. The 2001 Census involved ONS in running a parallel – mainly for fun – ‘census in school’ and this coincided with ONS joining with the international ‘**CensusAtSchool**’ project

to which I will refer later (<http://www.censusatschool.ntu.ac.uk/>). ONS has also gone on to develop 'stats4schools' (<http://www.stats4schools.gov.uk/>). Its stated aim is to help teachers and pupils get more from statistics. For pupils, there are datasets that can be downloaded and included in projects, free. For teachers there are lesson plans and worksheets to use in class, also free. The data used in 'stats4schools' come not only from the ONS but from across the UK government.

11. There are 15 lesson plans on the 'stats4schools' site and they feature topics that are likely to hold the attention of a class. For example, "how many people put 'Jedi' as their religion in the 2001 census?" through to "How much do you think your family spend in a week?". Each subject includes a lesson plan, worksheet and the data required.

12. The datasets for pupils similarly aim for subjects that are relevant. For example, "What does the nation read and who reads more, men or women?". The pupils are given a decoded dataset, an explanation of the questions asked in the survey, and the type of responses given. They are then asked to read the material carefully and decide on some hypotheses to investigate. In addition, there is a useful set of links to help teachers and pupils alike find other reliable sources of information.

13. CensusAtSchool is an international project which includes data from the UK, Canada, New Zealand, South Africa, Queensland (Australia) and South Australia (work is going on with the Australian Bureau of Statistics to produce an Australia-wide dataset). The project is sponsored by the RSS Centre for Statistical Education and has the broad aim of encouraging children to get involved with data-handling and improve their statistical skills. The international element allows children to compare their results with children from across the world.

14. The project is run from Nottingham Trent University in the UK and is seeking more countries to join (This can be done by email to censusatschool@ntu.ac.uk or phone +44 115 848 8408).

15. A review of CensusAtSchool suggested the project "provides an excellent focus within which children can experience the excitement of discovery, as well as achieve the aims and objectives of the national curricular. It can help them realise the need to become statistically literate, and help them get used to making evidence-based decisions".

IV BUT WHAT ABOUT THE REST OF US?

16. There is good work going on to educate the young but it is only scratching the surface of the lack of 'statistical literacy'. It may be true that there is a platoon of well-educated youngsters coming through the system armed with the ability to make the right interpretation of the masses of statistical data that surround them. But, given the recidivist nature of humankind, it is very likely that even this platoon will lose many of the skills not many years into adulthood unless something is done to keep it alive.

17. Iddo Gal ² looked at what basic knowledge people needed to retain in order to have a foundation for 'statistical literacy'. He argues: *"Almost all authors concerned about the ability of adults or of school graduates to function in a statistics-rich society do not discuss what knowledge is needed to be statistically literate, but usually focus on what needs to be taught in schools and argue that all school graduates should master a range of statistical topics, assuming that this will ensure learners' statistical literacy as adults."*

18. He suggests that many authors' lists of knowledge required to guarantee statistical literacy may be 'overspecified'. Basic knowledge depended on the functional demands of the context and culture. He went on to argue that it was not at all clear that learning statistical facts, rules, and procedures, or gaining personal statistical experience through a data-analysis project in a formal classroom context can in itself lead to an adequate level of statistical literacy.

19. There are many opportunities for adults to learn once they have moved on from compulsory and even university education. Most people though are lazy when it comes to understanding statistical material; the effort required to question the data is usually considered too much in a time-poor, convenience society. It is easier just to accept what is being fed to you even if it is of dubious provenance.

20. Some organisations are happy to make use of this laziness, but for the majority of groups with serious purpose there is a duty, or, at least, a responsibility to help their users. This applies to public and private agencies, media organisations and journalists, advertisers, and, of course, national statistical institutes.
21. For those that want to learn, the Internet offers a wealth of opportunity from numerous sites worldwide. For example, there is 'Statistical Literacy' at www.statlit.org, which says it 'studies statistics used as evidence in everyday arguments'.
22. 'Checking out the facts and figures behind the news', stats.org is a breath of fresh air. Its deconstruction of the many attempts by the media to make mincemeat out of data makes either grim-reading or high-entertainment depending on your mood at the time.
23. Stats.org also makes an attempt to explain some simple concepts in statistics and how they should be used and how they are often misused. Taking a simple example, in talking about percentages it says: "Another common trap is: suppose the homicide rate in a city went down by 50 per cent in one year and by another 30 per cent the following year, does this mean it has reduced by 80 per cent over two years? No!". It then goes on to explain how the calculation should be done. This may seem ridiculous to many but I have spent time trying to explain the same thing to a puzzled journalist.
24. In the UK there is www.numberwatch.co.uk which provides a list of sites which it claims are 'the leaders of the resistance against the new orthodoxy' but more usefully the BBC runs a regular radio series called 'More or less' (http://news.bbc.co.uk/1/hi/programmes/more_or_less/). This is supported by an excellent link with the Open University (www.open2.net/moreorless/). It takes a look at and explains a few common areas such as averages and probability and has a stab at explaining some confusing statistical terms such as 'significant'.
25. The BBC also attempts to explain the way it selectively uses statistics. Economics Editor, Evan Davies, sifted through a pile of National Statistics releases and decided on what story he wanted to tell. There were eight fairly standard releases all with descriptive rather than news titles (for example, *Mushroom production and sales survey* and *UK official holdings of international reserves*). He, though, decided the most important release was called *Revisions to Public Sector Finances – road maintenance and repair* which he admitted sounded as dull as the rest.
26. Yet, Davies argues, this apparently technical matter made it easier for the UK Chancellor to meet his self-imposed fiscal rules and make tax cuts in his next budget. This was clearly very convenient for the Chancellor particularly just ahead of a budget.
27. "Would it be biased of me to point out the convenience of the timing to the Chancellor? Or would it be remiss of me not to? Good reporting is not about broadcasting the noise of data on to the public. It is about making judgements as to the significance of available facts, and the pattern that fits them together," he says.
28. Journalists make judgements all the time, he says. And merely to report the figure would be of no use at all, leaving the vast bulk of viewers in the dark as to what the figures mean.
29. Evan Davies is an example of a statistically literate reporter who has become renowned for his attempts to explain arcane economic and business stories in a way that the ordinary person can understand. However, I'll leave aside the fact that the implication of his story was that the ONS produced its data to help the Chancellor politically which we definitely didn't!
30. Davies makes an important point that impartiality doesn't mean just sticking to the facts. To help statistically literacy in the media and other areas all NSIs need to strive more to explain what they do and what their data mean in the language of the ordinary person.
31. It's not impossible. As a good example I have chosen something from Cancer Research UK which sees the need to help its supporters and readers to understand the difference between 'absolute risk'

and ‘relative risk’. It leads on from there to explain ‘what does increase in risk really mean’.

(<http://info.cancerresearchuk.org/cancerandresearch/risk/communicatingrisk/absoluteandrelativerisk/>)

32. From there it attempts to help people separate fact from fiction. “When we hear about a particular risk factor in the media, how should we react? How do we decide whether a risk is ‘real’ or not?” It looks at study type, study size, previous studies and source. The explanations are simple and easy to understand and a great example of how to de-mystify statistics for the ordinary person and thus spread statistical literacy.

IV WHAT ELSE WE CAN DO

33. In preparing this paper, I looked back at the last time this work session featured the subject of ‘statistical literacy’ (Perugia, 1999). Many NSIs had active programmes to engage the media and public, and Portugal had created an interactive page on the Internet for the advancement of statistical literacy. But how well are we making it stick?

34. In the UK the Statistics Commission and ONS last year carried out research into trust in official statistics. Among the conclusions were the needs to ‘increase explanation’ and ‘enhance public education’. Using focus groups and interviews with the public and some key users, they came up with a number of comments made to them and some ideas of how to deal with them.

35. These ideas might be a starting point for how we should throw away the metaphorical ‘bottle’ and give the ‘horse’ what it needs – ‘water in a drinking trough’.

36. To wrap up I will summarise some of the comments made by the public and users:
(http://www.statscom.org.uk/media_html/reports/report_024/pt_2_s4_stakeholder_suggestions.asp)

- The simplicity of visual presentation could reduce misrepresentation of the data.
- A more proactive role in explaining the figures; at least highlighting areas that are interesting.
- There are huge amounts of social data thrown out raw and they mean nothing because they need interpretation. How about an ‘independent interpreter’?
- Use new Internet technology to provide more background information.
- The Journalists’ Union should insist journalists have training to understand how to interpret statistics.
- Long-term measures to improve general education.
- Equip people with ‘the tools to examine data critically’.
- Encourage people to turn away from ‘personal experience’ towards a ‘broader view’.
- Present statistics in a less intimidating way (provide a small widely available leaflet giving a picture of the country drawn from the statistics).
- Promote a regular TV programme with a popular presenter.
- Popularise statistics to remove the ‘fear fact’ and the ‘geek factor’.

Reference: Gal, I (2002). Adults’ Statistical Literacy: Meanings, Components, Responsibilities.
International Statistical Review (2002), 70, 1.

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TOP 10 STATISTICAL WRITERS' BLOCKS

Invited Paper

Submitted by U.S. Bureau of Labor Statistics, United States¹

I. INTRODUCTION

1. It's not as if statisticians can't write or that economists are semi-literate. The fact of the matter, as I see it from my seat as the publishing chief at the U.S. Bureau of Labor Statistics, is that statisticians and economists generally write with considerable mechanical competence and visible passion for their subject matter. It is not our technical inability to write, and especially not an inability to write for the professional audience that is the central issue, it is our failure to communicate with the rest of the world.

2. When I set out to organize my part of the session on statistical literacy, the part focusing on the writing side of the problem, I found some resistance to the notion that there was a deficiency-in-writing component to statistical literacy that paralleled the more thoroughly-documented difficulty in reading statistics. My thesis is that there is a considerable amount of work yet to be done to make sure that the statistical community is fully literate—able to write—to go along with the work my colleagues are doing to help the audience read statistics.

3. The work we have done in terms of statistical storytelling is valuable in a wide variety of contexts. Using only the multi-centric American statistical system to find examples, we can see opportunities taken to engage in statistical storytelling and develop engaging styles of communication about the meaning and interpretation of the numbers.

- The Census Bureau's "Facts for Features"
- The Economic Research Service's *Amber Waves*
- The Bureau of Labor Statistics' *Occupational Outlook Quarterly*
- The Bureau of Justice Statistics' "Key Facts at a Glance"
- The Energy Information Agency's "Energy Basics 101"

4. However, in the official statement of statistical findings it is still too common that communication breaks down and I can't propose in good conscience that official communiqués are an appropriate place for telling stories or trying to be entertaining. In this paper, I nominate my top 10 obstacles to official statistical communication; why is it that the official statistical communiqué is so difficult to write well?

¹ Prepared by Richard M. Devens (Devens.Richard@bls.gov).

5. The Top-10 format was chosen carefully. If I chose fewer, say seven, I'd have to cast this as "The 7 deadly sins of statistical writing," and the problem simply isn't quite that bad. If I chose more, say 12, I would have to cast this as a "12-step program for overcoming statistical writers' blocks," and I'm simply not quite that smart.

6. So, in the sections that follow I identify, explain briefly, and provide an example of these 10 issues. The examples were drawn *almost* exclusively from the work of my own agency, but I'm sure much will be familiar to many. My goal is simply to identify and admit to suffering from these blocks. After all, one of the most widely-recognized characteristics of twelve-step groups is the requirement that participants admit that they have a problem.

II. (1) LET THE NUMBERS SPEAK FOR THEMSELVES

7. I know this advice was given to me and would guess that it was given, at some point or points, to all of us at this session. The problem is that numbers don't really speak at all without some assistance from an interpreter. The quip, "Statistics will say anything if you torture them enough," makes it vital that we, as official communicators, provide numbers with a safe, objective, analytical place to talk with an interpreter sympathetic to the integrity of the data. Otherwise, the interpretation will be in the hands of those with the most sophisticated tools of persuasion. In my example, the numbers do speak, but I wonder who would be listening by the end of the paragraph.

- Before seasonal adjustment, the Producer Price Index for Finished Goods decreased 1.4 percent in February to 157.8 (1982 = 100). From February 2005 to February 2006, prices for finished goods rose 3.7 percent. Over the same period, the index for finished energy goods advanced 17.0 percent, prices for finished goods other than foods and energy increased 1.7 percent, and the finished consumer foods index fell 1.3 percent. For the 12 months ended February 2006, prices for intermediate goods moved up 8.2 percent, and the crude goods index rose 12.9 percent.

III. (2) ZERO-DEFECTS PARALYSIS

8. Statistical agencies are proud of their reputations for accuracy and precision. With some justification, we know that errors great and small are a danger to such reputations. In the production side of the house, this is usually reflected in careful testing, exhaustive quality control, and comprehensive training. And the clear objective of all that testing, control, and training is to never, ever make an avoidable mistake—and don't make any unavoidable mistakes while you're at it. Unfortunately, the surest way for a communicator to never make a mistake is to never make a statement. The cost of one strategy for never being wrong—saying as close to nothing as possible—is to almost never be right either.

- "In this example, there is a pay premium of approximately 44 percent for all private industry occupations in San Francisco relative to all private industry occupations in Brownsville; however the difference in average pay between San Francisco and Brownsville may or may not be statistically significant."

IV. (3) WHAT WE FIND VERSUS WHAT WE DO

9. It never fails to amaze me either, but it's true: Very few people very much care what statistical agencies do. Many people, however, seem to care very much about what statistical agencies find out by doing whatever it is they do. What starts as a laudable impulse to document concepts and methods first, and thus head off some questions from the few, can "bury the lead" for the many. Even a fairly glossy chartbook I reviewed recently had first bullets that defined in exquisite detail what we considered a family or how we calculated a displacement rate before giving the reader the facts they are looking for. I'm not sure why we allow it, but there are far too many releases that have some variant of the example as their lead sentence.

- “The Bureau of Labor Statistics of the U.S. Department of Labor reported today multifactor productivity data – output per combined units of labor and capital inputs – for 2003 and 2004.”

V. (4) BEING CORRECT IS BEING RIGHT

10. This point, the matter of what we do versus what we find that precedes it, and the point on statistical hypothesis testing that follows, are closely related. In many cases, it looks as if a writer’s goal is to demonstrate that the correct procedures were followed correctly, than to ensure that the right conclusion is drawn from the data available.

- Nonfarm payroll employment was little changed (+56,000) in October, and the unemployment rate was essentially unchanged at 5.0 percent

VI. (5) THE BALEFUL INFLUENCE OF SIGNIFICANCE TESTS AND CONFIDENCE INTERVALS

11. This is the one example I have drawn from outside my own little patch here at BLS. I’m in the business, and I’m not sure what to make of this paragraph. I tremble to think of what my family, friends, and neighbors would think. Just to be fair, I’ll confess that I have signed off on publications that called ordered lists of data “arrays” because “rankings” might be taken to imply that all pairwise combinations had been tested and found to be different at a standard level of statistical significance.

- Privately-owned housing units authorized by building permits in March were at a seasonally adjusted annual rate of 2,059,000. This is 5.5 percent ($\pm 0.9\%$) below the revised February rate of 2,179,000, but is 1.9 percent ($\pm 1.0\%$) above the March 2005 estimate of 2,021,000.

VII. (6) PRECISION IS CLARITY

12. We are minutely drilled in the precise details of our surveys and programs. Every definition is carefully thought through, every word on the form and in the interviewer’s manual is precisely meant. Where I believe we sometimes err is in assuming that transferring that detailed precision to the report on the findings will make the findings clear. In the example below, there are about seven degrees of precision. But I would propose that it is actually clearer to say “College graduates earn two and a half times what high school dropouts earn.” That is three degrees of precision, and fits in half the space of the set-up phrases of the example.

- “For example, among workers 25 years old and over, median weekly earnings of wage and salary workers who usually work full time are nearly two and a half times more for persons with at least a college degree than for those who have not completed high school.”

VIII. (7) EVERYONE NEEDS TO KNOW EVERYTHING WE HAPPEN TO KNOW

13. This particular block is rarer than it once was. There are fewer of the one-sentence word counts in the scores with dozens of parentheticals and clauses in squads of eight marching together as compound, complex, convoluted, and, in most cases, complete sentences. However endangered this tendency may be, we still had an author submit the following footnote (as the fourth of 27 in a 10-page manuscript):

⁴ The following table summarizes the state of estimates on CPI bias up through the Boskin Report:

Recent Estimates of Bias in the U.S. Consumer Price Index		
Author(s)	Point Estimate	Interval Estimate
Advisory Commission to Study the CPI (1995)	1.0	0.7 - 2.0
Michael Boskin (1995)	1.5	1.0 - 2.0
Congressional Budget Office (1995)	----	0.2 - 0.8
Michael R. Darby (1995)	1.5	0.5 - 2.5
W. Erwin Diewert (1995b)	----	1.3 - 1.7
Robert J. Gordon (1995)	1.7	----
Alan Greenspan (1995)	----	0.5 - 1.5
Zvi Griliches (1995)	1.0	0.4 - 1.6
Dale W. Jorgenson (1995)	1.0	0.5 - 1.5
Jim Klumpner (1996)	----	0.3 - 0.5
Lebow, Roberts, and Stockton (1994)	----	0.4 - 1.5
Ariel Pakes (1995)	0.8	----
Shapiro and Wilcox (1996)	1.1	0.7 - 1.6
Wynne and Sigalla (1994)	less than 1.0	----

This table is adapted from Moulton (1996)

IX. (8) THOU SHALT NOT JUDGE

14. Much the same as it is in all statistical agencies, our vision statement at the Bureau of Labor Statistics contains phrases such as “strongest commitment to integrity and objectivity” and “producing impartial, timely, and accurate data.” We all understand why it might not be appropriate to use phrases that imply unemployment is bad or that price stability is a desired state. But not making a judgement can go too far. In the example, the word “incident” is used very consistently in connection with motor vehicles improperly contacting each other, other solid object, or pedestrians. In my early days in statistical communication, I suggested that everyone calls that an “accident” and would most likely think that an “incident” was something different (and quite probably think it was something less serious). I was very firmly told we couldn’t use the word accident because it made the judgement that the incident could not have been prevented.

- “Fatal highway incidents were up slightly in 2004 after declining the two previous years. The 1,374 fatal highway incidents recorded in 2004 represented about one out of every four fatal work injuries in 2004. Although nonhighway incidents (such as those that might occur on a farm or industrial premises) dropped slightly in 2004, other kinds of transportation incidents increased, led by incidents involving workers struck by vehicles or mobile equipment.”

X. (9) THE AUDIENCE-OF-ONE PROBLEM

15. Every statistical communiqué is meticulously crafted for its specific audience. For better or for worse, that audience is one person—the senior executive with the authority to clear that release. On the better side, these individuals know a lot about the subject matter, have a good sense of how specific data fit into a broader understanding of the world, and genuinely want to communicate with that world. On the worse side, these individuals believe everyone knows the subject matter and how it fits into the bigger picture, so the shortcuts to communication that work for them will work for the world. In fact, many of these individuals are sure those shortcuts make the prose more elegant and knowledgeable sounding. The example below is from our Web site: The links under the title “Effects of Katrina on methodology” go to papers that reflect high levels of expectation of the audience; the “Overview” is what we could hammer out for the less-knowledgeable of the readership. One comment we received from the senior official when we submitted what became known as “Katrina lite” was, “Do you *really* think we need to simplify this more?”

Effects of Hurricane Katrina on BLS Employment and Unemployment Data Collection and Estimation

- Effects of Katrina on methodology:
 - Quarterly Census of Employment and Wages
 - Mass Layoff Statistics
 - Local Area Unemployment Statistics
 - Current Employment Statistics Survey
 - Current Population Survey
- Overview: Hurricane Katrina and Employment Situation Report -- *a short, non-technical summary*

XI. (10) THE VERBAL-PICTORIAL EQUIVALENCE RATIO HYPOTHESIS

16. We often are told that a picture is worth a thousand words. This empirical statement has been enthusiastically accepted by the statistical community. I have noticed that articles submitted to our *Monthly Labor Review* are increasingly chart heavy (as seen in the examples), that a “visual essay” feature we launched recently is oversubscribed, and that we are much more frequently asked to produce chartbooks in lieu of more ponderous annual bulletins. Sometimes this is the right thing to do—I’m especially mindful of the last example. But sometimes it is just that the hypothesis above is taken too literally and 10 charts and a few bullet points are thought to be the equivalent of a 10,000 word article.

17. I am going to propose an alternate hypothesis: H_2 : The modal verbal equivalence of a statistical chart is 5. In time series, “The series is going up (down)”; in cross-section, “A is larger (smaller) than B.” Yes, visualization is an important aid to understanding, but it is not a complete substitute for written communication. Well-integrated writing, visualization, and presentation are still the communicator’s objective. The articles

- “Strong employment gains continue in 1994.” *Monthly Labor Review*, February 1995.
<http://www.bls.gov/opub/mlr/1995/02/art1full.pdf>
 - 2 charts in 15 pages
- Lower unemployment in 2005, *Monthly Labor Review*, March 2006.
<http://www.bls.gov/opub/mlr/2006/03/art1full.pdf>
 - 9 charts in 14 pages

XII. SUMMARY AND CONCLUSION

18. Writing about the science of statistics is something of an art; writing about official statistics is a highly refined version of the art. In many ways the best official writing on statistics is analogous to the art of haiku poetry; an exercise in creating insight and clarity within a rigidly defined form. The 10 issues I have noted here are things that may be keeping us from writing our official statistical communiqués in even ordinary prose.

**UNITED NATIONS STATISTICAL COMMISSION and
ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS**

UNECE Work Session on Statistical Dissemination and Communication
(12-14 September 2006, Washington D.C., United States of America)

Topic (ii) Statistical literacy

INTERRELATION WITH USERS AND POLICY ON DISSEMINATION OF INFORMATION

Supporting Paper

Submitted by State Statistical Committee of the Republic of Azerbaijan (SSCAZ)¹

I. INTERRELATION WITH USERS

1. The processes of democratization and formation of market relations in the economy of Azerbaijan have inevitably entailed reorganization of state statistics, according to international standards. The policy and strategy of preparing and disseminating economic-statistical information was reorganized due to its role in forming public opinion. Conditions were created to give users rights of access to aggregated statistical data and methodology of production of statistical information, as well as transfer of information to mass media.

2. The provider of the statistical information in Azerbaijan is the State Statistical Committee of the Republic of Azerbaijan (SSCAZ). It is fully adherent to a policy directed to interests of users, and provides timeliness and flexibility in response to inquiries.

3. The community's level of confidence in official statistical information depends on specifying the concepts behind state statistics, as well as the implementation of an open and unbiased policy of data dissemination.

4. The fundamental principles guiding the state statistics of Azerbaijan in the process of preparing and disseminating statistical data are described as follows:

- assure confidentiality of the data received from respondents
- study customer demand and determine of the necessary output of data
- prepare high-quality data
- specify the scientific approach used in preparing information
- satisfy needs (interests) of users relating to size and character of supplied information
- assist in access of users to data source
- strive for timeliness and accuracy of information

¹ Prepared by Meri Amirova and Nemat Khuduzade.

5. By following the abovementioned principles in preparing and disseminating statistical data, the SSCAZ is consistent with requirements regarding to timeliness, relevance, as well as objectivity and democracy.

6. Dissemination and marketing of statistical information has changed radically. The knowledge and experience gained during implementation of the project within the TACIS² programme has brought major achievements. Today the prevailing means of dissemination of the information in the Azerbaijan is printed publications. The program of publications was expanded and the structure, contents and mode of publications were improved. The statistical yearbook is issued in the form of a book in both Azerbaijan and English languages, and a CD. Moreover, SSCAZ prepares corresponding information such as leaflets and booklets for different events of state importance. Yearbooks and other issues are improved regularly. As a result, in 2004, the yearbook now contains information on different points of the economy, and an alphabetical index for the first time. This year, the yearbook will be printed in a new typeface, Ventura 10. Some parts of the yearbook are distributed as free of charge and others at a cost. By means of these publications, statistical data are disseminated among a wide circle of users. Moreover, various statistical yearbooks for particular fields are published by different sections of the SSCAZ in Azerbaijan, Russian and English languages: national accounts, industry, construction, agriculture, transport and communication, prices, education and culture, healthcare, environment, labor, retail and wholesale trade, food security, and household budget.

7. In connection with Law of the Republic of Azerbaijan, dated 30 September 2005, № 1024IIQ “On reception of the information”, the corresponding structure on dissemination of information, and on work with users, was created. An edict was issued and the plan of activities to implement this law was confirmed. The SSCAZ provides all users with information on socio-economic development of the country, and this information, as well as press releases and statistical yearbooks, are distributed through a website for the general public. Catalogues of issued products are published and distributed through the website annually.

8. Supplying users with quality and necessary statistical information depends largely on the respondents that provide information. Taking this into account, the SSCAZ conducts regular work with them. With the aim to decrease the load on respondents, the volume of presented from local enterprises reports is reduced from year to year. Appropriate measures are taken to use administrative data and to increase its quality. Agreements are signed with the aim of the creating a partnership with respondents. There are currently 6,595 agreements already signed, 13.4% of the total number of entrepreneurs.

II. POLICY IN THE FIELD OF DISSEMINATION OF INFORMATION AND MARKETING

9. A database of users, created in August 2005 and based on MS Access, contains data on users for more than five years, and is renewed regularly. The creation of this database was based on recommendations in the framework of TACIS. It has simplified of the process of dissemination. The contents of the business-register of the SSCAZ were used for commercial dissemination of publications. Generally it includes ministries, public institutions, research institutes, international organizations, embassies of foreign states, large-scale firms and joint enterprises, mass media and the public. The SSCAZ has the right to provide paid services according to the new Law of the Republic of Azerbaijan “On Official Statistics” and “Statute on the SSCAZ”.

10. The web site of the SSCAZ contains monthly information on the main macroeconomic indicators, as well as press releases. The SSCAZ issues monthly reports on “Economic and Social development in the country”.

11. Work on marketing is conducted. The local statistical bodies, which also publish statistical collections and bulletins, are actively involved in this work, and distribute material among inhabitants of the region (town).

² Technical Assistance for CIS countries by the European Union

A. Relations with the press

12. One of the main channels of dissemination of information is mass media. Non-state organizations' need for statistical information increases every year. As a practical matter, presentation of the results of statistical work to the public would not be possible without mass media. Press conferences are organized with mass media quarterly. Progress in the development of e-technology is focused on distribution of statistical materials, which meet the requirements of users, by means of e-communication facilities.

13. During the last few years, there were significant changes in IT that have had serious consequences in the collection, processing and dissemination of information. The SSCAZ, being the basic supplier of the official information, uses modern methods of processing and dissemination of information.

14. Depending on the kind of activity, the SSCAZ is connected with different suppliers and customers of information, inside and outside of the country. Primary information from various sources enters the corresponding area (rural or urban sections, or head office) of the SSCAZ, where input, control and primary processing are realized, after which the whole of the information is directed to the main office for the further processing. All primary information is gathered in the head office of the SSCAZ, where further aggregation occurs and information is presented for dissemination.

15. At present, a number of software products and services allowing the entering, processing and forwarding of the SSCAZ's information, are developed in the Statistical Institution of the Republic of Azerbaijan. There are programs for processing of reports or questionnaires received from various sources, which the user can download from the Internet and install on their computer.

16. Until recently, the basic means of dissemination for the SSCAZ was publications. Now there is a website, which includes all of the information received as a result of the work of the SSCAZ, and any user can get access to it, at any time. A renewal of the information is periodically conducted, according to periodicity of the reports.

17. A number of software products that allow the SSCAZ to receive actual and precise statistical information at any time, were developed. This is an information system to gather, process and distribute statistical information. This system is developed with regard to the specific work features of a statistical institution; the system requirements of the given software product are minimal, and the system is cross-platform. To work, all that is necessary is a computer connected to a global network. Operational characteristics of the given system are rather high, and users of the system appreciate its simplicity and convenience. Each user of the system works at their own workplace, and all of the information can be viewed in one of several modes.

18. A flexible control system for access, allows control over the change and renewal of statistical data. Each user has certain privileges, and according to them, he/she has a right to modify existing, or add new data. , Unauthorized change of the information is fully excluded.

19. The user interface consists of two parts: internal (information that is only accessible to the administrator) and personal, which contains statistical data by branches of statistics.

20. The information is available for any user, who has an access to the network of the SSCAZ. These resources will be accessible to internet users in regional level in the near future.

21. Authentication of the user (persons having a right for updating of the information) is possible from any place within the system.

22. Taking into account that each branch has about one hundred indicators of different periodicity (the periodicity ranges from monthly to annual indicators), the system currently contains about 2,000,000 units of information, by different branches of statistics.

23. Detailed information on the monthly socio-economic situation of the country is published by SSCAZ in leading newspapers of the country. Press releases are published regularly and press conferences are conducted quarterly. The specialists of the SSCAZ periodically discuss the statistical indicators with journalists and other users. Employees of the SSCAZ give interviews by radio, television, and in the press, about the changes that take place in statistics.

B. Publication of the problematical data

24. All data that attracted higher interest (such as GDP, price index, inflation, and employment), is included in the reports published each month. The data are issued on time. Users of all categories have equal access to the statistical information. The dates of publications and press releases are fixed and made public. Certain works are carried out by SSCAZ concerning joining the IMF Special Standard Data Dissemination. The SSCAZ is a coordinating body on this matter, and systematically carries out activities with Ministry of Finance and National Bank of the country.

C. Tracking of the demand for statistics

25. The management of the SSCAZ tries to track various inquiries for statistical information in the country. The SSCAZ regularly receives inquiries from a range of users. The amount received by e-mail, from both local and foreign users, is increasing. According to Law "On reception of the information" the work has started on creating an electronic register of the required information.

D. Library

26. For simplified dialogue about statistical services, it is necessary to create conditions where consumers can see different statistical products. The statistical library is one of the priorities, and was created in 2002 with funding from the United Nations Population Fund (UNFPA).

27. The abovementioned fund provides the library with necessary statistical materials. A workshop on creation of an e-library catalogue has been organized by CSB Sweden. The books, with different thematic contents, by country and international organization, as well as two computers with internet connection, pattern-tracing machine, and projection device, are available in the library. The users have opportunity to take the statistical documents home, work in the reading room, or make copies.

III. INTERRELATION WITH THOSE WHO REPRESENTS THE DATA

E. Access to administrative data

28. Concerning data exchange, the SSCAZ maintains relations with different organizations such as: Custom Committee, Ministry of Finance, Ministry of Tax and National Bank. The SSCAZ receives administrative data from the Ministry of Education, Ministry of the Healthcare, Ministry of Internal Affairs, Ministry of Justice, Office of Public Prosecutor, National Bank, and others. The SSCAZ has direct access to the register of tax-payers, from where the information on the public is taken. The SSCAZ gives increasing attention to using administrative data for statistical purposes, and as a way to decrease of the load on respondents.

29. In spite of the abovementioned, we should recognize that the satisfaction of the expectations of all users is an unrealizable task.

30. The majority of statistical data distributed by statistical services has universal character and is intended for use in various purposes, by persons with different level of knowledge concerning use of the information. Some users couldn't define in advance which type of information they really need, as well as which type of information corresponds to their expectations. Attempts to raise the proper use of statistics among our users should be characterized by continuous review of the activities carried out by statistical services, in light of stated and prospective needs of users.

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UNECE Work Session on Statistical Dissemination and Communication
(12-14 September 2006, Washington D.C., United States of America)

Topic (iii) How to present metadata

**UNDERSTANDING THE ROLE OF METADATA IN FINDING AND USING
STATISTICAL INFORMATION**

Invited Paper

Submitted by University of Washington, Tacoma; USA¹

**I. THE IMPORTANCE OF METADATA IN UNDERSTANDING STATISTICAL
INFORMATION**

1. It is understood that metadata availability can enhance retrieval processes, improve online information organization and navigation, and facilitate user understanding of online objects. Our work focuses on developing an understanding of how and when users utilize metadata in order to model the resultant metadata requirements to support electronic access to and use of statistical information. Over the last several years, we have conducted a series of users studies on which we report here.

2. Metadata play a central role in the finding and interpretation of statistics. Metadata, such as the units used to report the data, the time period to which the data refer, the question the interviewer asked to generate the data, the sampling and non-sampling error of the statistics, and so on, are all critical to understanding the meaning and potential usage of a given statistic. It may also be necessary to understand the underlying concept that a statistic is intended to represent, the reason a particular statistic was produced, the history of the instruments used to produce the statistic, and so forth.

3. We have conducted three systematic investigations into usage of metadata and are currently engaged in a fourth. These are studies of:

1. Metadata requirements for understanding tables based on understanding the uncertainties users experience during table usage (Hert & Hernández, 1999).
2. Metadata requirements in integration tasks (Denn, Haas, & Hert, 2003).
3. One integration activity, the making of comparisons, investigating types of comparisons made and the rules experts employ while making comparisons (Hert, 2004).
4. The key metadata elements used in selecting potentially useful information objects.

The overall purpose was to inform the development of metadata infrastructures, such as XML schemas, to be used to support statistical information dissemination and use processes.

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II. STUDY ONE: USER UNCERTAINTIES WITH TABULAR STATISTICAL DATA: IDENTIFICATION AND RESOLUTION

4. The intent of the first study was to provide insight into metadata elements necessary to support usage of tables as well as understand the potential difficulties in attaining that metadata. This work provided a baseline categorization of types of metadata needed to enable users to resolve their questions associated with statistical tables. This project addressed the following questions:

- What questions and uncertainties do users have when investigating the statistical tables used in the study?
- What are the answers to these questions?
- To what extent is metadata available to answer the questions? What metadata would be necessary to answer these questions?

5. A total of 169 questions/uncertainties was identified. The categorization scheme had eight main categories: *Definitions needed*, *Table structure*, *Rationales needed*, *Survey methodology information needed*, *What's the difference*, *Interpretation of table needed*, *Information currency information needed* and *User uncertainty is not clear*. The majority of uncertainties (155 of 169 or 91%) are in the first four categories mentioned. These categories included uncertainties at several different granularities (e.g., for a term, about a survey's methodology, or for a specific table) and that covered the range from statistics in general, to survey methodology, to presentation.

6. The researchers attempted to find answers to all user questions. Only 59 of the 169 questions (35%) had an answer available online. The 59 include two questions that had supplementary information provided by an expert. A cluster of categories had rates of online answers ranging from 43% to 56%. These were: *table structure* (43%) *survey methodology information needed* (43%), and *category inclusion information needed* (56%). A second cluster ranged from 29% to 36%. These were *term definition needed* (29%), *tool functionality* (a sub-category of table structure) (29%), and *rationales needed* (36%). Forty-eight percent of the questions (81 out of 169) needed the assistance of an expert to answer and for 17% (29 out of 169) no answers were found or given by an expert.

III. STUDY TWO: METADATA NEEDS DURING INTEGRATION TASKS

7. The second study's goals were to reveal the kinds of issues that come up when users are completing integration tasks using statistical data, to identify the metadata elements associated with these issues and challenges, and from that information to begin to construct a metadata architecture that supported the metadata elements.

8. We described user interactions in terms of a set of key themes or "stories" that expressed a number of perspectives on the users' experiences and metadata usage. The themes were:

- User knowledge: People exploited domain knowledge, task knowledge, knowledge of statistical processes and agencies, and expectations about the availability and possible currency of information.
- Surveys and statistics: Granularity of data issues, different measure types, and manipulations (such as seasonal adjustments) all played a role in interactions.
- Interpretation of information: In interpreting individual statistics, expert users were sensitive to the date, units of measurement, associated footnotes, whether the data were preliminary, final, or revised, and so on. The comparability of dates, geographic units, data sources, variable definitions, and data collection strategies (survey vs. census primarily) all became important.
- Date issues: The timeliness, or currency, of the statistics that participants were attempting to use. The amount of difficulty that this issue caused for study participants was related to how much prior knowledge they brought to bear about particular agencies, their surveys and

censuses, and the frequency with which those surveys and censuses are conducted. Reconciliation of dates associated with multiple statistics was an important integration activity. This was difficult for the participants, because information about the intervals at which particular statistics are reported, and how quickly they are disseminated to the website after the reporting interval has passed, is not readily available.

- Geography: Three aspects were identified: 1) user knowledge of geography, 2) the available geographic granularity of a given statistic, and 3) the role of geography in integration activities.
- Navigation and information layout
- Terminology: Users' ability to understand or use specialized terminology or map it to more common concepts.
- Integration activities.

A. Integration Activities

9. We captured data about the process of integrating information, as well as barriers to successful integration. The most important integrating activities were 1) making comparisons 2) noting discrepancies (between data, in presentation approach, etc.) and/or reasoning about that difference and 3) manipulating statistics (e.g., mathematical, exporting to spreadsheets). Of these, the comparison activity appeared to be the core integrating activity. We identified a number of comparisons common across our participant pool; these types were:

- Comparison across geographic units,
- Comparison when there are definitional differences across concepts and variables,
- Comparison across units of time,
- Comparison across different sources (websites, surveys, censuses, reports, etc.),
- Comparison across index values.

10. We identified barriers to the successful integration of statistical information. These were:

- Lack of definitions or source information
- Lack of user knowledge of appropriate strategies (e.g., using time series data, types of calculations to perform)
- Lack of user knowledge about usage of index values, statistical activity purpose and approach
- Interface design problems (such as scrolling row and column headers)
- Inconsistent data across sources
- Inconsistent interfaces
- Inability to determine whether data wanted for comparison are available
- Lack of domain knowledge
- Lack of knowledge of how to handle domain terms such as inflation, seasonal adjustment
- Terminology differences

IV. STUDY THREE: THE METADATA REQUIREMENTS TO SUPPORT STATISTICAL COMPARISONS

11. To further understand comparisons and how metadata supports users making comparisons, we undertook a third study. The study's intent was to identify the 1) types of comparisons made or attempted by users and 2) the information that experts bring to bear on the making of those comparisons.

12. The experts identified the following comparisons as being relevant to end-user usage of their statistics:

- Comparison across geographic units,
- Comparison when there are definitional differences across concepts and variables,

- Comparison across units of time (data collected/reported at different times, different aggregations (e.g., quarterly, monthly), and different reference periods),
- Comparison across different sources (websites, printed sources, etc.),
- Collection approaches (survey vs. census, household vs. establishment, etc.),
- Comparison across index values,
- Terminology comparisons (same word-different concepts, same concept-different words),
- Comparisons with deflated vs. real dollars, corrected vs. uncorrected data, preliminary vs. final release data, seasonally adjusted data vs. non-adjusted data,
- Comparisons involving data with differing confidence intervals,

13. The experts also articulated some common questions or aspects of the data that they need to understand before attempting a comparison. These are framed as questions to ask below:

- Has there been a change in classification of the variable over the time period of interest?
- Are the data final?
- Are the data being compared from different time periods?
- Are the data being compared from different geographic units with the associated rule of thumb: get units geographically close to unit of interest?
- Is the comparison among index values?
- Is the comparison among measures that already have a comparison built in (e.g., percent change, percent distribution, rates, ratios)?
- Is the comparison among variables that are commonly conceptually confused (e.g., occupation and industry, employment rate and unemployment rate)?

These questions provide guidance as to necessary metadata elements for facilitating comparisons.

V. STUDY FOUR: KEY METADATA ELEMENTS IN ASSESSING RELEVANCE

14. The motivation for our current study starts with the fact that metadata creation is generally an expensive and labor-intensive process. Thus one wants to prioritize metadata creation by: 1) assigning the metadata elements that are most often used (for a particular task such as information discovery) and/or 2) assigning greater or lesser amounts of metadata based on the “value” of a given entity.

15. Identifying relevant items (after retrieval) is a bridging step to statistical information use. Thus facilitating a user’s ability to judge whether items are potentially useful is a precursor to use. In this study we ask the question:

What metadata elements enable a specific type of user (to be designated) to assess potential relevance of an entity to a specific task?

16. The basic logic of the study is to ask users to select, from a set of entity representations, those entities that seem relevant for the task at hand. By relevant, we mean “fit for the task at hand,” and we will refine that further prior to undertaking the study. By asking users to discuss what “cues” they used to make the judgments about selection, we learn about what metadata elements are useful. In this study, we will ask them to make judgments, then look at the selected entities themselves and re-judge the potential relevance. We expect that in discussing their judgments in the second step, they will point to aspects of the entities that indicate what constitutes value in addition to expressing more about the metadata “cues”. We intend to report on results at the meeting.

17. All of the work outlined above has been undertaken with an eye toward building a model of statistical metadata from the perspective of the end user of statistics, rather than from the perspective of the producer of statistics. As statistical agencies focus on making their data more accessible to the end user population, these efforts are important in providing a basis for prioritizing both the metadata elements that are provided as well as the statistical information objects about which metadata will be

provided. This is especially an issue for retrospective assignment of metadata to pre-existing statistical information objects.

VI. ACKNOWLEDGEMENTS

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VII. REFERENCES

19. Denn, S.O.; Haas, S.W; & Hert, C.A. (2003). Statistical metadata needs during integration tasks. 2003 Dublin Core Conference: Supporting Communities of Discourse and Practice—Metadata Research & Application. DC-2003: Proceedings of the International DCMI Metadata Conference and Workshop (Sept. 28 – Oct 2, 2003: Seattle, WA). pp. 81-90. Available at: http://www.siderean.com/dc2003/301_Paper50.pdf. Accessed 11/3/2004.
20. Hert, C.A. (2004). The Metadata Requirements to Support Statistical Comparisons. Govstat Technical Report. Available from the author.
21. Hert, C.A. and Hernández, N. (2001). User Uncertainties With Tabular Statistical Data: Identification And Resolution: Final Report to the United States Bureau of Labor Statistics (Purchase Order #B9J03235). Available at <http://ils.unc.edu/govstat/fedstats/uncertaintiespaper.htm> Accessed 11/4/2004.

**UNITED NATIONS STATISTICAL COMMISSION and
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CONFERENCE OF EUROPEAN STATISTICIANS**

UNECE Work Session on Statistical Dissemination and Communication
(12 to 14 September 2006, Washington D.C., United States of America)

Topic (iii) How to present metadata

KEEPING [WWW.STATCAN.CA](http://www.statcan.ca) USERS IN THE METADATA LOOP

Invited Paper

Submitted by Statistics Canada, Canada¹

I. INTRODUCTION

1. We know that our website users represent diverse constituencies, and that their information needs are equally diverse. While the content on our website continues to expand as new information becomes available, the challenge articulated by user feedback is to organize and link this growing information store in a way that helps users find the information they seek. Data are only useful as long as you can find them and understand them! Dumping all information in a heap in the user's lap is not helpful, and only leads to 'infobesity'. Statistical organizations must make an extra effort to organize and present our information so that users can find the most comprehensive information when they visit our websites.
2. When our website users find specific data, they often require other related information from Statistics Canada. They often need to know more about its availability, its applicability or its related context. Such information is often called 'metadata': some of it is found in 'meta-tags' encoded in web pages, but at Statistics Canada much of it can be viewed by users, and resides in various databases. However, our users require some, if not extensive, knowledge of these resources. The data in meta-tags helps search engines provide raw results, but the 'other' type of metadata provides the context users need to understand and make best use of the data. Users should be able to access our metadata easily and intuitively. To facilitate this, users have direct access to metadata via strategically placed links throughout our website.
3. This paper is not about metadata itself. Rather, I will attempt to demonstrate that users can access complex sets of metadata—the context around the data they want—without actively looking for them. We will look at Statistics Canada's approach to metadata and taxonomy, our user's needs and the solutions proposed on www.statcan.ca.

II. METADATA + TAXONOMY = ENRICHED CONTENT

4. The basic purpose of taxonomy is to define content in categories that can be organized and accessed efficiently by using a predefined set of common vocabulary. Our taxonomy is based on

¹ Prepared by Louis Boucher.

themes and sub-themes that organize our content into manageable subjects so they can be found by search or navigation. Such taxonomy enables us to relate data and publications from different sources; avoid confusion caused by synonyms; give the data a hierarchical structure; help users understand the relationships between data; and provide comprehensive navigation across our website.

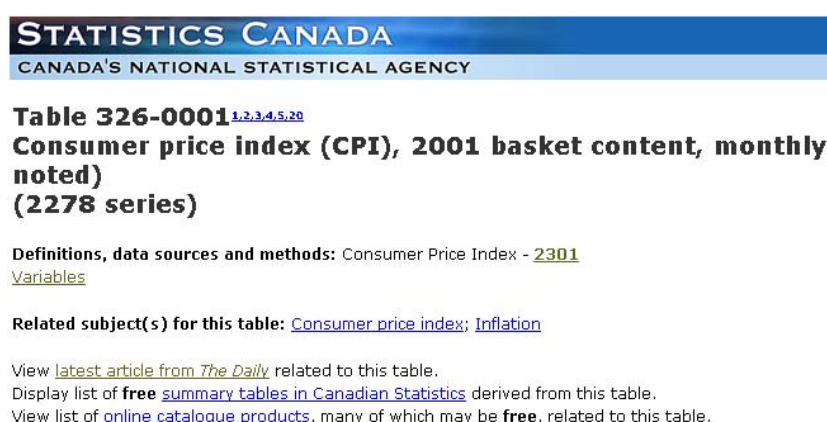
5. Statistical metadata—the information about statistical data and processes—enhance search and understanding of data for users; for us, statistical metadata improve and automate survey processing and facilitate data harmonization. However, metadata is not an absolute concept. Individual pieces of information, mostly data, become metadata when they are put into a descriptive relationship with something else. Simply put, a database of publication descriptors (price, media, author, etc.) becomes the metadata of the publications catalogue itself. At Statistics Canada, we have two metadata sources.
6. The first one is a comprehensive online catalogue of all products and services offered. Its underlying ORACLE database, called the Corporate Database of Products and Services, or CDPS, contains up to 60 fields to describe each publication and service available. Once a day, the latest changes are uploaded to our website. The CDPS can be searched or browsed by users.
7. The second metadata source is a comprehensive description of concepts, definitions, subjects, variables, methodologies and quality indicators about our statistical programs. Known as the IMDB (Integrated Meta Data Base), it is the second generation of a database of records that pertain to each statistical program such as surveys, administrative data acquisitions or the census. The IMDB also covers derived programs such as national accounts. As in the CDPS, each record has a unique identification number and up to 120 fields of meta-information about the source program. Like the CDPS, the IMDB is updated regularly.

III. WHAT ABOUT META-TAGGING?

8. Metatags—those hidden attributes encoded in the header of web page—describe precisely the characteristics and content of any web document. In theory, it sounds obvious that every document should be properly tagged. In practice, whose responsibility is it to do such daunting work? It is somewhat complicated, technical and constraining after all. Should the author determine the proper metadata and encode it in the source document? Is this the responsibility of the 'webmaster' or the catalogue librarian? We are currently addressing this issue by designing a framework of roles, responsibilities and processes with regards to metadata, taxonomy and meta-tagging.
9. Using a standard taxonomy across the Agency, both in our meta-tags and in our statistical metadata, is essential for managing and retrieving our web-based content. There has been an effort recently within the organization to assign and maintain proper metadata as well as updating our taxonomy over time. With a site as large as www.statcan.ca, it is not enough to have either metadata or taxonomy. Metadata without controlled vocabulary results in authors using different words to describe the same topic (e.g., teachers versus professors versus educators). Using just taxonomy organizes data for management of content but not for retrieval of content. Used together, both concepts render some consistency of data across different databases and information sources, which simplifies its management and retrieval. To simplify its fundamental application, authors are provided with technical documentation on how to meta-tag their documents at the source. It is just a matter of time before all our website content is properly tagged.

IV. SHOULD USERS BE FAMILIAR WITH OUR OWN METADATA?

10. Simply put, they need to know as little as possible about it. We need to make those technicalities completely transparent to users. When users reach our website, they have an objective in mind, be it the latest population count or a specific study. They want this information from a trusted source. It is our responsibility to document and arrange our growing data holdings to enable most users to retrieve what they seek with the minimum effort and the least possible knowledge about our internal processes.
11. Assuming that the metadata and taxonomy framework discussed above is properly deployed a priori, the webmaster's task is then to develop a web interface that will assist users retrieve the information they seek. There are 'classical' proven approaches such as search engines, thematic lists and site maps that help users find their way around massive information holdings like those of statistical organizations. The approach we have chosen is to proactively present all contextual information to the users during their visit to our website. This enables us to make reference to our metadata in one comprehensive interface. The following example illustrates this strategy.



STATISTICS CANADA
CANADA'S NATIONAL STATISTICAL AGENCY

Table 326-0001^{1,2,3,4,5,20}
Consumer price index (CPI), 2001 basket content, monthly noted)
(2278 series)

Definitions, data sources and methods: Consumer Price Index - [2301 Variables](#)

Related subject(s) for this table: [Consumer price index](#); [Inflation](#)

View [latest article from The Daily](#) related to this table.
Display list of [free summary tables in Canadian Statistics](#) derived from this table.
View list of [online catalogue products](#), many of which may be **free**, related to this table.

12. In this scenario, the user has selected a detailed data table from our commercial CANSIM output database and is about to download it. (CANSIM, or Canadian Socio-economic Information Management System, offers users dynamically generated tables of much of our current and historical social and economic data.) At this stage, we propose that users consult supporting documentation related to this data table. All this documentation is available from different sources within the website; it can also be accessed in isolation from the different modules, assuming that the user is familiar with their original location. However, most users would not know they exist, nor would they be willing to spend more time looking for that documentation during their visit. This is where a little bit of proactive thinking and presentation creativity can transform rigorous metadata into intuitive documentation to users.
13. By clicking the *definitions, data sources and methods* link, users have access to the IMDB, the exhaustive metadata repository of the survey related to the selected data table. The *related subject for this table* link enables users to directly access our taxonomy and thesaurus. The *view list of online catalogue* link offers direct access to the CDPS, the products and services metadata. The two other links also lead to related information for this table. By presenting our metadata in a simple descriptive approach, we maximize the possibility that users will consult it. Users can access our various metadata sources without having to be familiar with metadata technical and conceptual framework. We call this 'metadata at work'.
14. Even though this seems simplistic, we had to create a small dedicated database called the Common Object Repository (COR) to support these links. One can imagine each link to and from each metadata source could be hard-coded in each source. However, this would be costly to maintain and difficult to keep current. What COR does is link every metadata source via the

unique survey identifier from IMDB. The assumption is simple: every data holding, publication and study has to be generated by a survey conducted by Statistics Canada. For the example illustrated above, the CANSIM table is related to one survey where the COR metadata for this survey directs the user toward the appropriate taxonomy and the catalogue items. This process is fully automated.

V. TOO MUCH INFORMATION LEADS TO “INFOBESITY”

15. Users’ expectations are high and, like other websites, www.statcan.ca is constantly evolving to meet users’ needs and expectations. This does not mean inundating them with more information than they need. Our task is to present results in an orderly manner, enabling users to then make their own choices. Some users prefer to launch a search and peruse the results list; others will browse the subject list. It is important to better understand users’ behaviours in order to present our data holdings in a comprehensive and useful manner. The challenge is to find the right balance that suits most users.
16. We have an extensive market research program to assess the characteristics of our clients, their interactions with the site and their expectations. We do periodic market research using pop-up questionnaires on the entire site as well as specific segments of it. We conduct usability testing and observational research, and monitor e-mail and traffic logs. We work closely with the staff in our regional offices to make the website works for them and for their clients.
17. One of the problems that both users and Statistics Canada staff had with the website was that the information was fragmented and voluminous. One solution we found is integrating the various elements of the site so that the puzzle is virtually complete. The starting point can be *The Daily*: every *Daily* release has a short summary on the www.statcan.ca home page that is linked to the full article in *The Daily*. The article contains links to the publication it describes; the publication in turn contains a full analysis of the data and a full set of charts and tables. *The Daily* article has its own tables and charts, and it also links to related metadata. Analysts who want to analyze the full dataset can follow the links to the relevant CANSIM tables given at the bottom of *The Daily* article or the survey metadata from IMDB. Our goal is to automate as many of these links as possible so that little manual intervention is required to create and maintain the relationships between the pieces of metadata. The following example illustrates such integration. Via *The Daily*, users have full access to our metadata and more.

Latest release from the Consumer Price Index

Friday, July 21, 2006

Released at 7:00 a.m. Eastern time in The Daily

PDF

[Troubleshooting PDFs](#)

June 2006

[Previous release](#)

Canadians paid 2.5% more for the goods and services in the Consumer Price Index (CPI) basket in June 2006 than they did a year earlier. This was slower than the 12-month change of 2.8% in May.

Available on CANSIM: tables [326-0001](#), [326-0002](#), [326-0009](#), [326-0012](#) and [326-0016 to 326-0018](#).

Definitions, data sources and methods: survey number [2301](#).

More information about the concepts and use of the CPI are also available online in *Your Guide to the Consumer Price Index* ([62-557-XIB](#), free).

Available at 7 a.m. online under *Today's news releases from The Daily*, then *Latest Consumer Price Index*.

The June 2006 issue of the *Consumer Price Index*, Vol. 85, no. 6 ([62-001-XIB](#), free) is now available from the *Our Products and Services* page of our website. A paper copy ([62-001-XPB](#), \$12/\$111) is also available.

The July Consumer Price Index will be released on August 22.

For more information, or to enquire about the concepts, methods or data quality of this release, call Client Services Unit (toll-free 1-866-230-2248; 613-951-9606; fax 613-951-1539; infounit@statcan.ca), Prices Division.

18. For search, we used to present long list of results organized by date or ranking. This forced user to browse through extensive listings without any context. We came up with the idea of pre-arranging search results on a 'scorecard' as illustrated below.

The screenshot shows the Statistics Canada website's search interface. At the top, it says "STATISTICS CANADA" and "CANADA'S NATIONAL STATISTICAL AGENCY". Below this are three tabs: "Simple Search" (selected), "Advanced Search", and "Search Help". The search bar contains the text "cpi" and a "search" button. To the right of the search bar is a link "Start new site search". Below the search bar, there are two radio buttons: "All of these words" (selected) and "Any of these words". Below that, it says "Recommended: ☐ "consumer price index". At the bottom, there is a "Summary of results:" section with two columns of links. The left column includes "Latest news releases in The Daily (31)", "Summary tables in Canadian Statistics (4)", "Detailed tables from CANSIM (\$) (17)", and "Census (0)". The right column includes "Publications (38)", "Analytical studies (5)", "Definitions, data sources and methods (7)", and "Learning resources (15)".

19. The search results for "Consumer Price Index" lead to 158 results that would have been originally listed. Instead, we arranged the summary of results around metadata to facilitate selection by users. If users are looking for a particular study about the Consumer Price Index, it they will find it easily by clicking *Analytical studies*—in the right-hand column of the search results listing—and selecting it from the five items there. The process is the same for accessing the detailed CPI tables from CANSIM. This is another example of putting the metadata to work for user's benefit.

VI. CONCLUSION

20. In this paper, we have tried to demystify metadata by showing how a statistical organization like Statistics Canada can make it accessible to its users in a practical and transparent manner. There many other ways to do so. A better understanding of users' needs supported by a rigorous internal framework about metadata, taxonomy and meta-tagging will enable us to provide the most efficient interface for our users.
21. A live demonstration of www.statcan.ca will illustrate the approaches discussed in this paper.

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UNECE Work Session on Statistical Dissemination and Communication
(12-14 September 2006, Washington D.C., United States of America)

Topic (iii) How to present metadata

PRESENTATION OF DESCRIPTIVE METADATA ON THE ABS WEB SITE

Supporting Paper

Submitted by: Australian Bureau of Statistics, Australia¹

I. INTRODUCTION

1. Publishing statistical information on the ABS web site allows our clients to design their own reading experience. This, in turn, allows them to meet their information needs efficiently and effectively through viewing only those components of our larger information suite which interests them.
2. However, in being selective, clients may misunderstand our information through missing or ignoring important parts of it. It is also possible that they will simply fail to find what they are looking for.
3. This sets us a problem. How do we make sure that clients find the information they need, recognise its value and understand its messages? The answer is, we cannot. We can never be entirely sure that our clients' needs are fully met. However, there are a number of ways in which we can help them find and understand what they seek.
4. The ABS contends that clients are best helped to use and understand statistical information by having relevant descriptive metadata readily at hand as they search for, evaluate and apply that information. As well, we contend that such descriptive metadata best serves its purpose when presented at levels of detail tailored for the clients' uses.

¹ Prepared by: Mano Georgopoulos (mano.georgopoulos@abs.gov.au)

II. PRINCIPLES

5. The ABS has adopted a number of principles to guide evolution of our web site to better service our on-line clients' needs. These principles are:

- layering – presenting information in layers, with the simplest presented first, and the most complex last, hyperlinked to allow easy navigation between layers
- contextual linking – hyperlinking to explanatory materials from the information to which they relate, and layering them at equivalent levels of detail, and
- writing for on-screen reading – presenting information in readily digestible chunks, not requiring extensive scrolling of or jumping between screens, and written in everyday language.

6. Further detail about these principles can be found in *Data Communication - Emerging International Trends and Practices of the Australian Bureau of Statistics, 2006* <<http://www.abs.gov.au/Ausstats/abs@.nsf/mf/1211.0>>.

II. CLIENTS

7. The ABS believes that these principles will best enable us to address the needs of our broad range of clients, who we have categorised as:

- tourists – infrequent users of the information they are viewing, and perhaps of the ABS web site; seeking small amounts of summary information on a topic; 'statistically naive' in the topic at hand, even if expert in other information
- harvesters – generally interested in the same type of information at regular intervals and generally have a good understanding of their data needs
- miners – very experienced users interested in acquiring a large volumes of detailed information and explanatory materials.

II. ADOPTING A LAYERED APPROACH ON SCREEN

8. Research suggests that presenting information in layers improves client understanding. It facilitates communication with a diverse range of on-line users with different levels of statistical sophistication.

9. In line with this approach, the ABS web site currently displays information in the following layers:

- Headlines – concise, factual statements drawing attention to, and capturing interest in newly released statistics or other newly published information
- Simple story of the data (main features) – summarising the principal statistical results of a publication or other product
- Detailed story (detailed publication) and detailed statistics (spreadsheets, data cubes and time series).

III. CONTEXTUAL LINKING TO METADATA

10. Use of layering and linking approaches described above also applies to the presentation of metadata. This allows users to view supporting information appropriate to their needs.

11. For example, a simple story of the data (main features) may include links to brief summary explanatory notes. Typically these take the form of mouse-over annotations or notes on an associated web page. These summary explanations, however, may themselves include hyperlinks to more detailed information.

12. Detailed stories and detailed statistics (publications, spreadsheets, etc.), on the other hand, will not necessarily be confined to linking explanations in this way. Rather, they may include direct links to the most detailed sources of explanation such as: data dictionaries; concepts, sources and methods publications.

IV. WRITING FOR, AND PRESENTING INFORMATION ON SCREEN

13. In a web site, explanatory materials may be published in one location and linked to from numerous places. However, to do this effectively we need to create small ‘grabs’ of information of broad relevance. This information needs to be concise and expressed in commonly understood language. Otherwise, we will distract our clients from their main task, which is to understand our statistics. Complex and wordy explanations defeat their own purpose.

14. Too much explanatory material also becomes a distraction and obscures the meaning of the information it seeks to explain. Now that we are no longer constrained by the number of pages that can be reasonably bound in a paper book, we could potentially swamp our core messages with explanations of them. It is important, therefore, for us to be selective in what we explain, and how.

15. Not only must explanations be concise, they must also be displayed on-screen in ways facilitating quick comprehension. This is important for all statistical and related information, as in the web environment one layer may well serve as an explanation for another. All information, therefore, must be presented for on-screen viewing:

- lines of text should be short
- pages should make judicious use of space and should be easily scanned
- pages should not include non-essential distractions
- every object upon a page must have an identifiable purpose
- information on web pages should be broken into single topic paragraphs wherever possible, and
- sentences too should cover only a single proposition.

V. IMPLEMENTATION

16. The ABS is currently enhancing its publishing systems to support the full adoption of these principles. We are also developing and delivering training for:

- ABS authors – to help them to organise their information in this new manner, and
- web site users – to help them read and understand information structured according to these principles.

17. The need to undertake these developments means that we will be implementing our new publishing vision in a staged fashion. This staged approach, however, has the added benefit of demanding only incremental cultural change for both writers and readers of our statistical and related information.

VI. CONCLUSION

18. Many of the approaches outlined in this paper have been well tested in other contexts. For example, educators have long introduced new fields of learning to their students, beginning with simple concepts and moving to the more complex. Contents pages, footnotes and indexes in scholarly texts illustrate the value of providing help at the point of need.

19. The web allows us to offer greater flexibility to our clients than has been the case in the past. In a web environment we can easily allow expert users (miners), and those familiar with the topic at hand (harvesters), to skip highly summarised information and move directly to the most detailed and complex data. As well as narrowing their searches - to help them find what they are seeking, we can introduce them to wider contexts for the information they are viewing - to enhance their understanding. And we can do all of these things simultaneously using the same strategies. In short, we can ‘communicate’ our information to them, not merely ‘disseminate’ it for their unguided consumption.

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Topic (iii) How to present metadata

**RESEARCH-BASED METADATA REQUIREMENTS FOR A BLS REPORTS
ARCHIVE¹**

Supporting Paper

Submitted by Bureau of Labor Statistics, United States²

I. INTRODUCTION

1. The Bureau of Labor Statistics (BLS) is creating an Internet accessible archive consisting of publications dating back to 1886. Most of these publications are in paper form and must be scanned. All the scanned files will have appropriate metadata added to them. Currently we have only 10 years of the past 120 years of our publications available online.
2. Expectations of users are increasing for gaining digital access to historical documents. It is much cheaper to provide publications electronically via the Internet rather than adhering to older methods of mailing disks or paper copies of documents. Many of the older publications exist as a single paper copy and most are located at our national office. If the BLS national office suffers a disaster many publications will be very difficult to locate or even destroyed altogether. We want to preserve these more securely as well as make them available to the public. A solution to this situation is to digitize them.
3. A few years ago the BLS hired an outside contractor to scan some 750 publications. The scanned publications came back to us in no real order and without any metadata. It was soon decided that we needed to educate ourselves regarding the work required to produce an archive useful for both dissemination and preservation.
4. Because the National Archive and Records Administration will be responsible for the long-term preservation of our digital documents, as they are for all our permanent records, we participated in the Cornell Library's Workshop for Long-term Digital Preservation. We needed to know what is expected in long term preservation of digital objects. We also needed to determine what to consider when presenting digital objects to an open user community. After participating in a number of workshops and seminars we decided upon Adobe Acrobat's Portable Document Format/Archive (PDF/A) with Extensible Metadata Platform (XMP) as our file format and metadata technology.
5. We are near the start of the process of scanning these publications and will be using the Minolta 7000 Scanner. It has optical character recognition (OCR) capability, however we aren't planning to rely on it during this first phase of the project.. Once we have assembled a respectable collection of digital documents, we hope to disseminate them through an Internet accessible archive available through the BLS website (www.bls.gov). For this, we must develop an effective user interface, containing several ways to search for documents. Existing state government archives will be used for inspiration.

¹ The opinions in this paper are due to the authors and do not necessarily reflect the policies of the Bureau of Labor Statistics.

² Prepared by Scott C. Berridge, John J. Bosley, and Daniel W. Gillman, U.S. Bureau of Labor Statistics.

6. How we design an effective web site for the archive is a large part of the project. We have determined that we will scan all the documents but leave them as images. We wish to provide metadata for our users to help them find appropriate publications, but we are not sure what metadata is most effective. User studies, based on group interview techniques of typical users of BLS data will shed light on this problem.

7. So, in this paper, we describe in more detail some of the main issues discussed above. First we detail the scanning process and some of the other physical needs of the archive, such as disk space requirements. Next, we discuss the element set for the metadata items that are most important for the archive. In particular, the metadata needs for dissemination and preservation are compared and contrasted. Also, the importance of taking metadata items from a standard set is reviewed. Finally, the results of some user studies conducted to help determine which metadata elements are needed by users is provided.

II. ARCHIVE REQUIREMENTS

8. Disk space requirements are still not known at this time, because we don't have an estimate of the average size of the PDF files of the scanned images. We do know that there will be servers both inside and outside the firewall for staging and testing of the content of the archive and to provide access to the public. One of the luxuries we have is that all of our publications are in the public domain and do not have any copyright restrictions. Another question we have not answered is how to ensure that any publications accessed through our site are authentic. There are a number of ways to do this using the existing software, but we have not settled on one yet

9. Still, we have some time to make final decisions on these questions as it will take some time to get enough publications digitized to begin the archive. We estimate that we can scan approximately 100 pages per hour at a maximum with our resources. We do expect to have the archive ready for public access by September, 2007 when we release the updated BLS website. As a result of what we have accomplished so far we are now considering on implementing bureau wide policy regarding formats and the metadata schema and applying them to all documents produced as permanent records.

10. We are near the start of the process of scanning these publications and will be using the Minolta PS7000. The scanner's capabilities are:

- 17" x 23-3/8" scanning area easily scans oversized bound volumes, ledgers, archival records, and other large documents
- Up to 600 dpi resolution for 11" x 17" originals, 400 dpi for 17" x 23-3/8" oversized pages with legible text and clear, sharp halftones
- Automatically compensates for page curvature at the center spine when bound volumes don't lie flat
- Automatically masks borders, erases shadows, and eliminates the images of fingers that may be holding pages open
- Scanning speed: 4.5 seconds per page (8 1/2" x 11")
- Centers scanned image for output

11. As we do not have a complete inventory, we estimate we are holding approximately 8000 publications to be scanned. Once we have assembled a respectable collection of digital objects we hope to disseminate them through an Internet accessible archive accessed from our website (www.bls.gov).

12. We want to provide a variety of ways to search and browse through the archive's collection and are looking at developing our own architecture based upon inspiration provided by some current state

libraries. The archive is expected to be organized for search or browse for words and phrases, time period, and topic. We hope to offer a website directory, a preferences site to change the appearance of a search, and My Favorites to view publications saved in the Favorites of the archive.

13. While we have been offered a license at no charge to use the Arizona Memory Project (AMP) as the architecture of our archive, there is some hesitation to do so due to security and compatibility concerns. The BLS is very security conscious. One consideration is to create our own in-house architecture based on archives such as the AMP.

III. METADATA ELEMENTS

14. The term metadata as used here means the data used to describe a file and its contents. This is consistent with the usual informal definition of metadata, which is data about data.

15. Metadata fulfils two main needs for the archive: dissemination and preservation. By dissemination, we mean the metadata required for users to search and decide which publications are most appropriate for their needs. This corresponds to the contents of an archived file. These elements include program and subject matter metadata. By preservation, we mean the metadata needed by archivists for maintaining the archive and keeping track of files. This corresponds to the files themselves, and the elements typically contain location and size of the file, who is responsible for the file, the date the file was created, and others.

16. Searching for publications, especially on the web, is enhanced by the use of well-known tags for metadata elements. If a user knows that some standard set of metadata elements, including known tags, are used to describe the files and their contents, then this makes searching easier. An effective way to do this is to use some metadata standard. Since the publications in the archive refer to labor statistics, it makes sense to choose an element set developed within the statistical community.

17. The social science data archive community has developed a standard set of XML elements called the Data Documentation Initiative (DDI)³. It is used to document social science data sets, and it has much detail for describing the contents of such data. However, because of the structure of the DDI, even small subsets of the overall element set may conform⁴ to the standard.

18. The BLS archive is intended to contain publications dating back to 1886. Not that much is known about the contents of these publications, and the metadata, therefore, must be relatively general in nature. In addition, the resources available at BLS to dig into the contents of each publication and thoroughly describe them is limited. Therefore, a small set of elements from the DDI was chosen to use to describe the publications. This subset conforms to the DDI, and it corresponds to the dissemination purpose of our metadata scheme.

19. In addition, descriptions of the files themselves are needed, too, and this corresponds to the preservation purpose of the metadata scheme. Again, elements from the DDI were chosen. This may not be the best choice, as the DDI is not really a standard for running an archive. It was built for describing the contents of files. Until we find a more appropriate standard for this, we will continue to use the DDI. We are looking at several choices presently.

20. Our tag name of the chosen elements and a typical example from the BLS Archive are provided below. The elements are listed based on use, either for dissemination or preservation:

- DISSEMINATION ELEMENTS --
- <Title> Usual Weekly Earnings of Wage and Salary Workers: First Quarter 2006
- <Subtitle> First Quarter 2006

³ Data Documentation Initiative (DDI) has a web site at <http://www.icpsr.umich.edu/ddi>.

⁴ An implementation conforms to a standard if it satisfies all the requirements of that standard.

- **<ID Number>** USDL 06-696
- **<Author>** Dept of Labor / Bureau of Labor Statistics / Current Population Survey
- **<Other ID>** N/A
- **<Producer>** Office Employment and Unemployment Statistics
- **<Copyright>** Public domain
- **<Time period>** 1st Quarter 2006
- **<Collection Date>** Feb – Apr 2006
- **<Country>** USA
- **<Geographic coverage>** National
- **<Geographic unit>** US
- **<Unit of analysis>** US workers
- **<Universe>** US employed adults, 1st Quarter 2006
- **<Kind of data>** Cross-tabulation
- **<Comments>** N/A
- **<Series Name>** Quarterly Wage and Salary
- **<Series Info>** See 4th Quarter 2005
- **<Version>** N/A
- **<Holdings info>** BLS/OPUBSS, 2 Massachusetts Ave, NE, Washington, DC
- **<Keywords>** Median,
- **<Abstract>** N/A
- PRESERVATION ELEMENTS --
- **<Title>** Wage-Salary-1Q-2006.pdf
- **<File type>** pdf
- **<Producer>** Scott Berridge
- **<Production date>** 9 May 2006
- **<Production place>** OPUBSS
- **<Scan software>** Adobe Acrobat Professional 7.0
- **<Scan hardware>** Minolta 7000
- **<Depositor>** LabStat

- **<Deposit date>** 11 May 2006
- **<Distribution date>** 12 May 2006

21. The Extensible Metadata Platform (XMP) from Adobe Systems, Inc will be used to describe and store the metadata recorded for each file. The Metagrove™ system from Pound Hill Software⁵ will be used to define a schema based on the elements and provide the capability of capturing the metadata for each digital image file.

IV. STUDY METHODOLOGY

A. General Description of Method

22. The research reported here collected information from a cross-section of the general public concerning the kinds of metadata elements that would be useful to them in finding statistical information in the archive and in assessing its relevance. A literature search found only scant previous work to guide this study. One of the more useful and relevant research reports that was found was based on a previous BLS-funded study by Carol Hert and Gary Marchionini (1997)⁶. Otherwise, little attention has been paid to getting inputs about metadata from non-expert users.

23. Lacking any widely-used methodological precedent, we decided to adopt (and adapt) one of the common methods for eliciting information about peoples' conceptual tools of thought: This is the focus group method, characterized by Kitzinger (1997).⁷

B. Research Participant Selection and Recruiting

24. We selected study participants from an existing BLS database of volunteers for cognitive studies of survey methodology. In order to insure that those selected would have sufficient experience with finding and using statistical information, our recruiter used a short list of screening questions during phone interviews with prospective participants to select a sub-set who were sufficiently qualified. Only those who satisfactorily passed this preliminary screening were invited to join one of the focus groups.

25. The essential characteristics that were required for inclusion in our study were:

- A positive response to whether the individual had ever looked for any statistical information produced by a US federal statistical agency.
- A judgment that the candidate's descriptions of how and why they were seeking and evaluating statistical information indicated enough familiarity with the process to qualify them for participation. This eliminated individuals whose searches were naïve and ineffective, the information sought was not really statistical, or the individual had no clear purpose in mind.

⁵ Pound Hill Software - <http://www.poundhill.com>

⁶ "Topic, geography, and time were dimensions of statistics that seemed to be important to the focus groups in terms of distinguishing between user needs. The groups indicated that many of their users wanted local data and would take higher aggregations (state, region, national) if local data were not available. The need for current as well as historical data was mentioned and there was some suggestion made that this was one way to distinguish between questions." Hert and Marchionini, *Seeking Statistical Information in Federal Websites: Users, Tasks, Strategies, and Design Recommendations*. Final Report to the Bureau of Labor Statistics, 1997, <http://ils.unc.edu/~march/blsreport/mainbls.html>

⁷ "Focus groups are a form of group interview that capitalises on communication between research participants in order to generate data. Although group interviews are often used simply as a quick and convenient way to collect data from several people simultaneously, focus groups explicitly use group interaction as part of the method. This means that instead of the researcher asking each person to respond to a question in turn, people are encouraged to talk to one another: asking questions, exchanging anecdotes and commenting on each others' experiences and points of view.¹ The method is particularly useful for exploring people's knowledge and experiences and can be used to examine not only what people think but how they think and why they think that way."

Kitzinger, J. "Qualitative Research: Introducing focus groups," *BMJ* 1995;311:299-302 (29 July)

- Finally, self-directed information-seeking participants were found by asking if they had had professional assistance or help with the search task.

26. A fairly high proportion of our volunteer pool met all these selection criteria, and we were able to recruit individuals to participate in our focus groups quickly. Five such groups were conducted, each with 4 to 7 participants. This made it easier to control the discussion and maximize its relevance to the research objective.

27. The script of topics used as a guide was modified in light of accumulating experience after each group was conducted. However, the first three groups engaged in a relatively "open-ended" and highly exploratory discussion of what information attributes they would self-select as metadata elements for statistical information. The last two groups, on the other hand, were led through a much more structured discussion and evaluation of specific metadata elements that had been tentatively selected from the DDI as a good sub-set, in the researchers' judgments, to describe BLS publications.

28. All group discussions were videotaped, and the two researchers [JB and DG] who led the focus groups reviewed these tapes. They abstracted from the discussions in the first three groups the attributes and qualities of statistical information that were most frequently nominated spontaneously by our volunteers. A similar review of the tapes from the second two groups, who evaluated the selected set of DDI elements, examined the extent to which the most popular descriptive characteristics mentioned in the exploratory sessions were contained within or clearly related to some members of the DDI-based set. These two group discussions also contained sufficient material that was tied to specific metadata elements to provide deeper and more nuanced insights into our volunteers' expectations regarding the form, level of detail, and other aspects of the top-ranking elements within the set.

V. RESEARCH FINDINGS

C. Findings from Initial Exploratory Groups

29. We were confident the volunteers had some concept of metadata, however, non-expert users of statistical information, such as the participants in this study, are unlikely to understand the distinction with data. We made this assumption here in order to steer the group discussion so that the data-metadata distinction would be gradually discovered. Consequently, during the initial phase of our research, our approach to guiding the discussion of data and metadata focused on getting the participants to use their own ideas and concepts, and we tried not to "put words into their mouths." The participants narrated in their own terms the questions to which they sought answers, how they evaluated the relevance of information found to their informational needs, and their decision about the usefulness of the information (For a more detailed model of the cognitive processes here, see Bosley and Conrad, 2001⁸). In this phase, we sometimes used metadata-free examples of data as stimuli to determine what would be the best descriptive attributes for users who were seeking to understand these data. This tactic posed the conceptual distinction between data and metadata in the starkest terms. Perhaps unsurprisingly, the participants were baffled and frustrated while attempting to make sense of these examples, so that care was taken not to continue this kind of discussion for very long! Even in the discussions of metadata-free numbers, the consensus was that there were three important attributes for statistical information: topic, time, and geography. This finding agrees with Hert and Marchionini (1997).

30. When the focus of discussion moved later to real documentary reports based on BLS statistics, the members of the different groups demonstrated a common and strong interest in the same three most significant descriptors: topic, time and geography. Beyond these attributes, however, the data-metadata distinction seemed to be easily forgotten when an abundance of contextualizing metadata or narrative based on the data is supplied.

31. Some time was devoted to an exploration of the significance sample surveys. Many participants indicated an awareness of and interest in the target population, some assurance that the sample was properly drawn and representative, and other elementary methodological information. On the other hand,

⁸ Bosley, J.J. and Conrad, F.G. "Usability Testing of Data Access Tools," Proceedings of the 2nd International Conference on Establishment Surveys, June 17-21, 2000, Alexandria VA: ASA Publications, pp. 971-980 (2001)

although most were also aware of sampling error and variances, they did not express much interest in specific information about error. Gaining information regarding the presence or absence of bias was sometimes identified as an issue, although only a small minority expressed this. Most seemed to trust the federal statistical agencies; those who did mention possible bias sometimes did so as part of a lack of faith in the objectivity of federal statistics. This in turn was based on an impression that some political or economic agenda was at work to influence the statistical production process.

32. Finally, an important but ancillary methodological finding is worth reporting. It is important to state that while these volunteers were paid for their participation in the study and demonstrated great willingness to "play along" with the researchers in a meaningful way, in every case the discussion revolved around describing statistical information that was of little personal, subjective interest or value to the participants. This rendered the discussions somewhat abstract or academic. As such, it was probably difficult for most volunteers to conceive of desirable metadata attributes beyond the most essential: topic, time, and geography. Nevertheless, serendipitously, there was an unexpected and important finding. Lacking *a priori* and self-generated needs for the information, many volunteers wanted information that would answer the questions: "What can I do with this information?"; or "How could this information be useful to me?"

D. Findings from Groups Focused on DDI Elements

33. The two groups whose discussions were oriented to an evaluation of the selected DDI elements strongly confirmed the primary importance of the key descriptors uncovered in first phase: topic, time, and geography. Interestingly, the title was expected to contain the topic. The value of identifying the organizational source of the information was not explicitly tested since this was a given in this case. This may have been an oversight, as a review of the earlier tapes showed that volunteers made good use of this information in the case of the metadata-free data. We cannot assume, therefore, that the informational value of source organization is negligible.

34. In their discussions of the important metadata contained in the title of the material, these groups reiterated their strong desire for some information indicating how the information can (in general) be useful. For example, one segment of discussion indicated that the inclusion of the phrase "A Guide" within the title might be nearly as valuable to users as knowing the subject-matter or topic, since this indicates that the information will incorporate some "directions for use."

35. If there is insufficient descriptive information in the title, the groups indicated that they would likely first seek additional information in the subtitle element. If that in turn was insufficient to meet their needs, keywords could be used to extend and refine topical information. The groups were, however, only willing to admit limited use of keywords. They demonstrated a fairly sophisticated appreciation of the possibility that long lists of keywords provide so much and so varied information as to become more confusing than helpful.

**UNITED NATIONS STATISTICAL COMMISSION and
ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS**

UNECE Work Session on Statistical Dissemination and Communication
(12-14 September 2006, Washington D.C., United States of America)

Topic (iii) How to present metadata

CREATING A USER-FRIENDLY GLOSSARY AND OTHER METADATA MAKEOVERS

Supporting Paper

Submitted by Energy Information Administration, United States¹

I. INTRODUCTION

1. Creating helpful metadata on the web is often overlooked or the last thing to be done, and sometimes we hold on to the model we have used for years in the paper world. This paper discusses the importance and power of making transitions from paper metadata to electronic metadata: How using the capabilities of the web to provide metadata can enhance the user experience on your site.
2. EIA has had a busy year redesigning our website and improving our search engine. In addition, we have looked at other areas for improvement on our website and will share three experiences involving metadata.
3. First, in reorganizing a huge amount of energy consumption data, we ran into a balancing act of showing too much information about the data versus not showing enough. What is a good balance to help customers find what they are looking for?
4. Next, our old glossary was just an alphabetical list of words. Our new web-friendly glossary allows users to search differently for terms, allows staff to create custom glossaries, and provides on-the-spot popup definitions where needed.
5. Finally, an area of some frustration to many authors and users alike is the use of footnotes on the web. What is the best way to give definitions, what is the best placement for footnotes, what is a good format? We have been thinking about these questions.

II. TOO MUCH VS. TOO LITTLE ON THE PAGE

6. Strange as it may sound, sometimes having too much information (too many links, too much description, too many places to navigate) on a web page can actually hide the data customers are looking for. You can see the problem with a quick review of our old energy consumption page.

¹ Prepared by [Melinda Hobbs melinda.hobbs@eia.doe.gov].

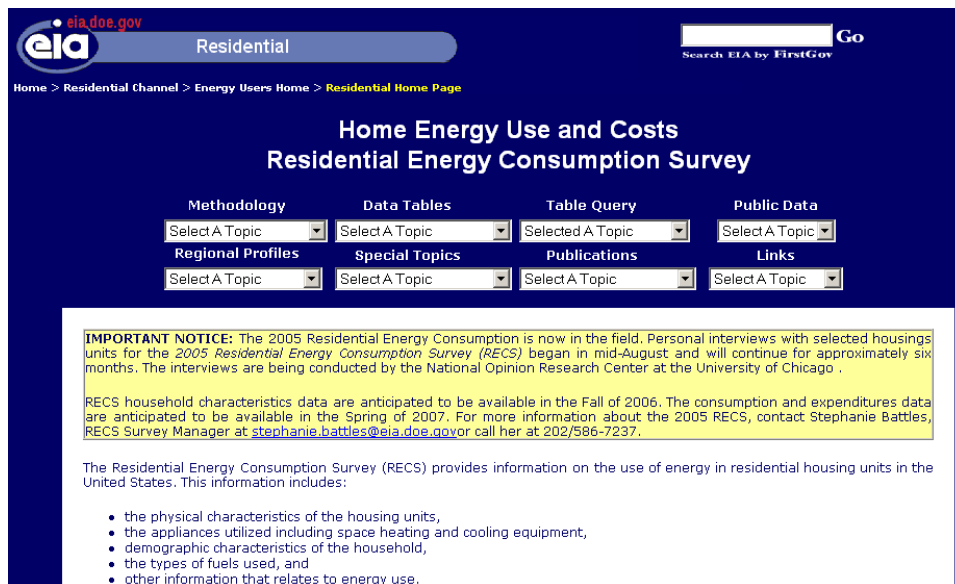


7. Customers used to ask how they could get to the data and whether the data they did find are the most recent we have. There was very little information on this page telling people the kinds of data available. Users tended to look at the long and interesting titles on the right side bar, which were in fact supporting analyses, and would get lost very quickly from this page.

8. If they happened to get beyond this page, the next page gave a long, complete set of data tables available for the survey. Even though the title of the page clearly stated the data for 1998, because this survey is only fielded every four years (with up to 18 additional months for posting), the date looked very old. How would customers know this was, in fact, the most recent data? We were diligent about labeling the dates of the data, but not about explaining why it seemed so old. There was a link to information about the data, but how many people would take that side trip or even see the link with so much on the page?

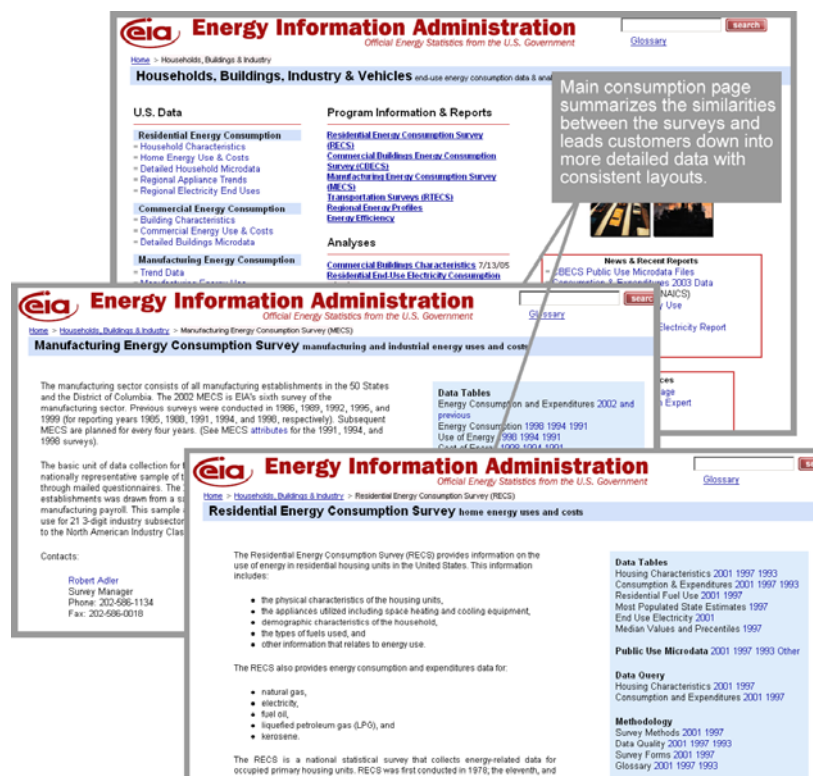
9. Another problem was that when the new data did become available, this table was replaced with all new links, making it difficult for users to get back to the previous data. If you happened into these pages through a search and just got dropped in, you probably would not know what you were looking at.

10. A final problem was that each consumption area (residential, commercial, manufacturing) displayed their data in a different format. (They were different groups so they thought why not have a different look?). The theory behind the residential energy page, for example, was to have everything above the fold.



11. It's a good theory, but it has to be usable and understandable. All the actual information was hidden under the dropdowns and there was no way to tell which topic was more important. This design, meant to help the users, ended up being more confusing.

12. During the redesign we decided to combine all the consumption surveys on to one second-level page instead of the four we had previously. To highlight the data and allow the customers to get data faster, we pulled out similar kinds of information across all the consumption surveys. We aimed for consistency on each survey page.



13. On the new pages, it's much easier to see the kinds of data available, the years available, along with an explanation of the survey and more detailed information about the data or survey. Putting everything out on the website without some sort of organization hid the hierarchy of information and was a disservice to our customers.

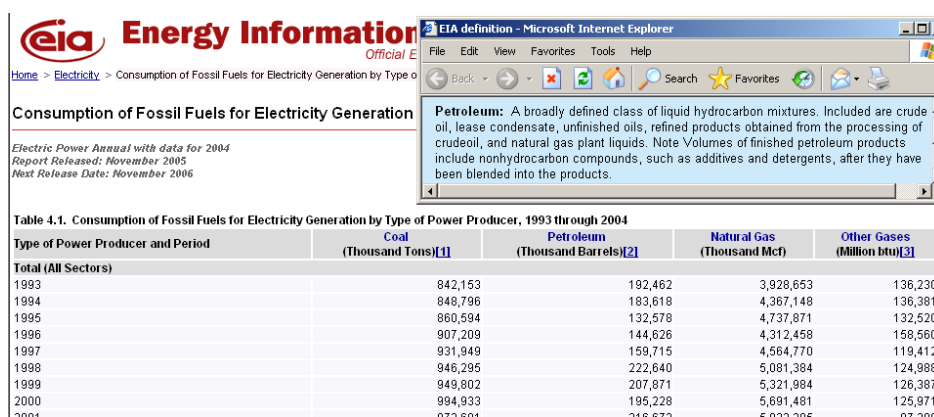
III. USEFUL GLOSSARY

14. Our old glossary was like many others, with pages of like-lettered definitions in alphabetical order. EIA’s glossary began as many small, separate, product-specific glossaries. As a result of different authors and different offices, sometimes the definitions of the same term didn’t match.

15. EIA undertook to consolidate all the terms and agree on common definitions. In our new glossary, all the terms mean the same thing. But each publication or report still wanted its own glossary so they manually had to pull the terms they needed and package them into a customized glossary.

16. Our new web glossary puts each of the terms into a database. This allows authors to pull out subsets of terms (for products that do not need the entire glossary) without having to “create their own.” Customers can now search the glossary for a specific term, several terms, and related terms.

17. Because the glossary is now a database, the terms can be linked to from tables and publications so the definition can pop up with a click on the term in context.



The screenshot shows the EIA website with a table titled "Table 4.1. Consumption of Fossil Fuels for Electricity Generation by Type of Power Producer, 1993 through 2004". A pop-up window from Microsoft Internet Explorer displays the definition for "Petroleum".

EIA definition - Microsoft Internet Explorer

Petroleum: A broadly defined class of liquid hydrocarbon mixtures. Included are crude oil, lease condensate, unfinished oils, refined products obtained from the processing of crudeoil, and natural gas plant liquids. Note Volumes of finished petroleum products include nonhydrocarbon compounds, such as additives and detergents, after they have been blended into the products.

Table 4.1. Consumption of Fossil Fuels for Electricity Generation by Type of Power Producer, 1993 through 2004

Type of Power Producer and Period	Coal (Thousand Tons)[1]	Petroleum (Thousand Barrels)[2]	Natural Gas (Thousand Mcf)	Other Gases (Million Btu)[3]
Total (All Sectors)				
1993	842,153	192,462	3,928,653	136,230
1994	848,796	183,618	4,367,148	136,381
1995	860,594	132,578	4,737,871	132,520
1996	907,209	144,626	4,312,458	158,560
1997	931,949	159,715	4,564,770	119,412
1998	946,295	222,640	5,081,384	124,988
1999	949,802	207,871	5,321,984	126,387
2000	994,933	195,228	5,691,481	125,971
2001	977,691	216,672	5,237,305	97,308

18. When this feature was shown to internal staff they actually applauded! Having the definition so readily available is very helpful to customers. This database is useful to staff internally for customizing specific glossaries and it’s helpful to customers looking for definitions.

IV. NOW, WHAT ABOUT FOOTNOTES ON THE WEB?


19. Footnotes and sourcing isn’t a glamorous issue so it doesn’t get as much attention, at least in EIA. Most people seem to concentrate on the main information and not pay too much attention to the inclusion or format of the sourcing.

20. A more useful way to show footnotes is having them pop up like the new glossary definitions shown above or at least having them linked so users don’t have to scroll up and down to see footnotes. Web authors need to move away from “thinking in paper” even though having notes all at the bottom or on a separate page is needed for printing.

21. Our data are still primarily being footnoted and sourced from within static tables, which forces interested users to have to search on their own for sources and definitions. Sometimes the footnotes at the bottom of the page are live links to the sources, while other times they are just typed links, depending on the legacy system that generated the table or whether the file was “hand made.” And, even if the table were created new from the beginning, whether the footnotes were relevant, consistent, and live depends on the skill of the person who made it.

22. In many cases, the initial metadata is stored in a database but placing it as a live link where it is needed is limited by the type of data table it is attached to. Legacy dissemination formats have not been rethought and reworked because we have had to focus more on the data collection side.

23. A final problem is the inconsistency of footnotes for static and dynamic tables, publications, papers, charts and graphs. Here is a good example of footnoting.


Energy Information Administration
Official Energy Statistics from the U.S. Government

[Glossary](#)

[Home](#) > [Electricity](#) > Existing Capacity by Energy Source

Existing Capacity by Energy Source

Electric Power Annual with data for 2004
Report Released: November 2005
Next Release Date: November 2006

Table 2.2. [xls](#) [pdf](#) format

Energy Source	Number of Generators	Generator Nameplate Capacity	Net Summer Capacity	Net Winter Capacity
Coal ^[1]	1,526	335,243	313,020	315,364
Petroleum ^[2]	3,175	37,970	33,702	37,339
Natural Gas	3,048	256,627	224,257	241,391
Dual Fired	3,003	193,115	172,170	184,399
Other Gases ^[3]	119	2,535	2,296	2,259
Nuclear	104	105,560	99,628	101,377
Hydroelectric Conventional ^[4]	3,995	77,130	77,641	77,227
Other Renewables ^[5]	1,608	21,113	18,763	19,000
Pumped Storage	150	19,569	20,764	20,676
Other ^[6]	42	754	700	716
Total	16,770	1,049,615	962,942	999,749

[1] Anthracite, bituminous coal, subbituminous coal, lignite, waste coal, and synthetic coal.
[2] Distillate fuel oil (all diesel and No. 1, No. 2, and No. 4 fuel oils), residual fuel oil (No. 5 and No. 6 fuel oils and bunker C fuel oil), jet fuel, kerosene, petroleum coke (converted to liquid petroleum, see Technical Notes for conversion methodology), and waste oil.
[3] Blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels.
[4] The net summer capacity and/or the net winter capacity may exceed nameplate capacity due to upgrades and overload capability of hydroelectric generators.
[5] Wood, black liquor, other wood waste, municipal solid waste, landfill gas, sludge waste, tires, agriculture byproducts, other biomass, geothermal, solar thermal, photovoltaic energy, and wind.
[6] Batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, and miscellaneous technologies.
Notes: Where there is more than one energy source associated with a generator, the predominant energy source is reported here. Totals may not equal sum of components because of independent rounding.
Source: Energy Information Administration, Form EIA-860, "Annual Electric Generator Report."

V. CONCLUSION

24. Of course content is most important on our websites. But without useful and understandable and findable metadata, users won't be as successful with our information. Metadata shouldn't be a scary word; it's a group of tools to help users find their way through piles of sometimes confusing statistics. Especially important is having metadata using web capabilities to allow people to link, jump out and jump back in, and search. Metadata shouldn't be just adding information at the end like in an old-fashioned paper report or having it in static files.

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UNECE Work Session on Statistical Dissemination and Communication
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Topic (iii) How to present metadata

**PUBLISHING METADATA WITH DATA - XML BASED DISSEMINATION PROCESS OF
STATISTICAL INFORMATION (COSSI)**

Supporting Paper

Submitted by Statistics Finland¹

I. INTRODUCTION

1. Statistics Finland has been developing XML-based data dissemination for a couple of years now. The dissemination system is based on the model of common structure of statistical information (CoSSI), and the dissemination is based on XML documents compatible with it. The CoSSI model covers different ways of statistical data organisation (statistical data matrix and statistical table), statistical publications (monthly and quarterly publications, press releases, etc.) and quality declarations. The structuring of the metadata connected to statistical data is also implemented within this system.

2. The metadata part in the CoSSI model is divided into document metadata, statistical metadata and processing metadata. Document metadata is information about the producer of the document, the document's content, date, statistical topic, etc. Statistical metadata is information vital for the interpretation of numerical statistical information, and describe the variables in a statistical table or matrix. This metadata information is useful for the user in the dissemination process by helping the interpretation of statistical figures, and for the producers of statistics when metadata are transferred between statistical production stages. It could be also used for bilateral exchange of statistical information between statistical agencies.

II. COSSI - COMMON STRUCTURE OF STATISTICAL INFORMATION

3. The point of departure in the CoSSI (Common Structure of Statistical Information) was an (infological) analysis of the information being considered. The conclusion from the analysis was that although in practice the definition of statistical information has varied according to a given situation and application, in reality statistical information has a certain simplifiable and acceptable universal structure. The CoSSI describes the general structure that is not dependent on the situation of the statistical information presented in differing formats.

4. The defining of the structure was not restricted in advance by selecting or specifying a certain application technology, which would have automatically determined or limited the volume or properties of the information that was to be analysed. The same also applied to the choice of the method used for describing the information, for it can be quite fatal if the applied technology requires that certain limitations or simplifications irrelevant to the information be included in the model. In fact, such

¹ Prepared by Harri Lehtinen (harri.lehtinen@stat.fi).

limitations and simplifications narrow the content of the information being considered, and may even cause outright loss of information. On the other hand, the demands imposed on the used description technology must not be excessive, either. It is sufficient for the used description technology to meet the minimum criteria necessary for the presentation of results from an analysis of the information.

5. So the CoSSI model defines the structures of statistical data (matrices and tables), metadata (document and statistical metadata, and quality declarations), and publications. XML DTDs have been selected as the technical means for implementing these structures. The CoSSI model is comprised of several DTDs that can be modularly combined for different types of documents. The basic document types are a statistical table, a statistical matrix and a publication. These documents are XML documents that are compatible with the CoSSI model and also contain the metadata and the language versions necessary for describing a set of statistics.

III. METADATA PROJECT

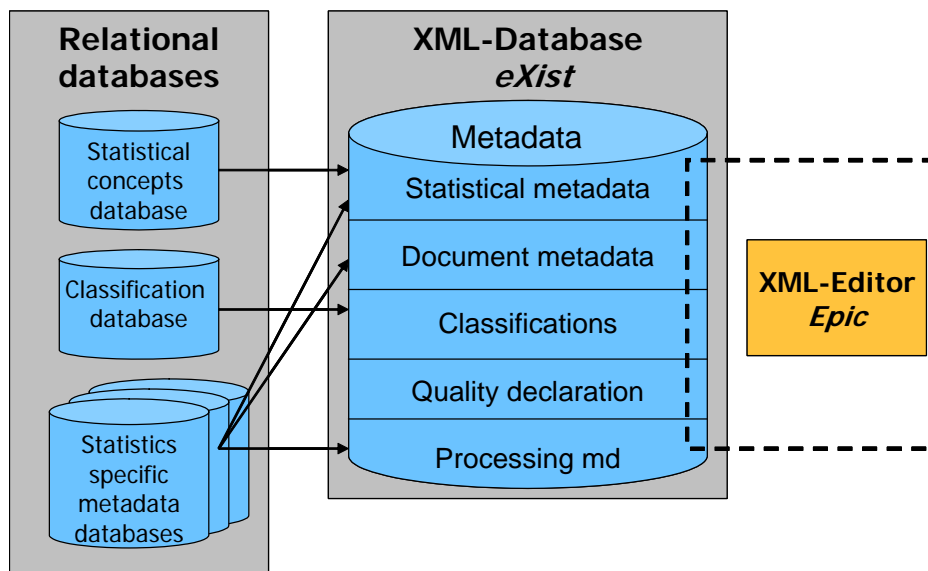
6. Statistics Finland launched a metadata project in spring 2006, with the aims of creating a common display and updating environment for its existing, separate metadata databases. At the moment, metadata are stored at Statistics Finland in the classification database, database of statistical concepts and in various metadata solutions tailored for the specific needs of the agency's statistics departments. These solutions have largely been implemented as relational databases, which are maintained with special software designed for this purpose. The intention is to standardise these separate databases of metadata by creating an XML database that fits the CoSSI model.

7. The task of the project is to ascertain and define how the metadata in the relational databases can automatically be converted to an XML format that fits the CoSSI model and saved in the XML database. A further task of the project is to create a user interface for updating and maintaining the XML format metadata documents in the XML database. The system should also be capable of augmenting fragmented or deficient metadata. The project will also create a comprehensive system of identification codes with which different categories of metadata (statistical, document and process metadata, quality declarations and data descriptions) can be linked to statistical data, tables and publications.

8. eXist database was selected as the XML database. eXist is an open source database that Statistics Finland has tested and piloted in connection with its project relating to the revision of its production of publications. In the aforementioned project the database was principally used for saving tables and publications. This metadata project will extend its use to the metadata side.

9. The planned user interface for the updating of metadata is the Epic editor. By virtue of the project on the revision of publication production, Epic editor will also function as the publishing editor for XML-based publication production and an interface has already been tentatively tailored for it for adding and updating statistical metadata into tables in publications, and for adding metadata to documents. The intention is that the use of the Epic editor will be expanded in the metadata project by improving its user interface relative to metadata and by adding to it new templates that also enable handling of other types of metadata.

10. The intention is to transfer the data into the XML database as XML documents that fit the CoSSI model. Over time, the XML database will, thus, grow into a comprehensive collection of metadata relating to the statistics production of Statistics Finland. In addition, the metadata will then also be in one frame of reference (the CoSSI model) conformant with one model, and in standardised format (XML). As the work progresses, the need to broaden the current metadata definition of the CoSSI model is bound to arise, but any required expansions can be implemented easily and dynamically thanks to the model's properties. Because of the modular structure of the CoSSI model, new components can be added to it and existing definitions in it can be expanded.



11.

Figure 1. XML database as metadata warehouse

12. An advantage in using the XML technology as the format for metadata, data, tables and publications is that they can all be linked to a common model of information structure - CoSSI. The common model also allows extensive use of standardised tools for data processing. All types of data can be saved in one, common database (eXist XML database), they can be handled and updated using a common interface (Epic editor), and can also be combined and converted using standard XML techniques.

13. The modularity of the CoSSI model also makes it possible to compile a variety of documents for diverse purposes from these data. Tables for publications can be picked out in XML format, statistical metadata describing the data in the tables can be attached to them and the contents of publications and its authors can be described with document metadata. Statistical and document metadata can be attached to a table for publishing it in a database, as well as processing metadata to steer the publishing.

IV. XML-BASED PUBLISHING SYSTEM

14. Statistics Finland has been developing XML-based publishing system which sets out XML documents, publications, tables, matrices and metadata that are compatible with the CoSSI model. The system converts these XML documents automatically into the formats required by different dissemination channels.

15. An output format compatible with the tables and matrices of the CoSSI model is needed for statistical software applications for XML-based publishing. The main applications Statistics Finland uses are SAS and SuperStar, and PX-Edit for PC-Axis tables. At the moment PC-Axis tables in matrix and table formats can be produced with PX-Edit and output format for matrices and tables has also been developed for SAS. In the newest version of SuperStar there will be an output in the CoSSI table format (CALs).

16. The actual production of publications takes place at the statistical operating units where statistical experts write the text, select the tables for the publication and produce the statistical graphics. Epic software was selected as the editor for XML-based publishing, and was tailored during year 2005 to function as the production editor for publication documents conforming with the CoSSI model. In the tailoring the user interface of the editor was made as user-friendly as possible and functions were added to it that support e.g. importing of external XML tables compliant with the CoSSI model into a publication, production of language versions, completion of metadata and writing of text. Technically, XML is hidden in the editor, so the editing environment is quite similar to that of familiar word processing programs.

17. An XML database into which statistical metadata compatible with the CoSSI model are saved as XML documents has now been taken into test and piloting use. As tables are made, descriptions of the variables selected for them can be retrieved from the database and thus included in the dissemination. There is also a connection into the XML database from the Epic editor, so statistical metadata can also be

retrieved via the editor. Statistics Finland chose XML database called eXist to be the database for publications, statistical data and metadata.

18. In consequence, a monthly or quarterly publication written with the Epic publishing editor becomes a document compliant with the CoSSI model and contains all the material of one publication, i.e. text, tables, statistical and document metadata, figures and language versions, in one XML file. These publication originals in XML format are saved in an XML database (eXist), which becomes the publication archive. Published tables and matrices are also saved in XML format into the archive.

19. Before its publishing, a publication in XML format still has to be converted into the format required by the used dissemination channel. For publishing on Statistics Finland's website, an XML publication is converted fully automatically into HTML and PDF formats. The conversion into HTML format produces a set of HTML pages from one XML publication so that the caption text of the publication forms the start page and the contents listed under it form links to other parts of the publication. The conversion produces sets of HTML pages in all languages that are present in the XML publication. Besides HTML versions, PDF documents are also produced in each language, and these can be offered to customers as printable versions on the HTML pages. The conversion into PDF format produces one PDF document per each language version in the XML publication.

20. The author of the publication can check the final HTML and PDF versions that will be disseminated prior to their publication. When the publication is ready, the author has at his or her disposal a publishing program for defining when the publication should be released and which files should be published.

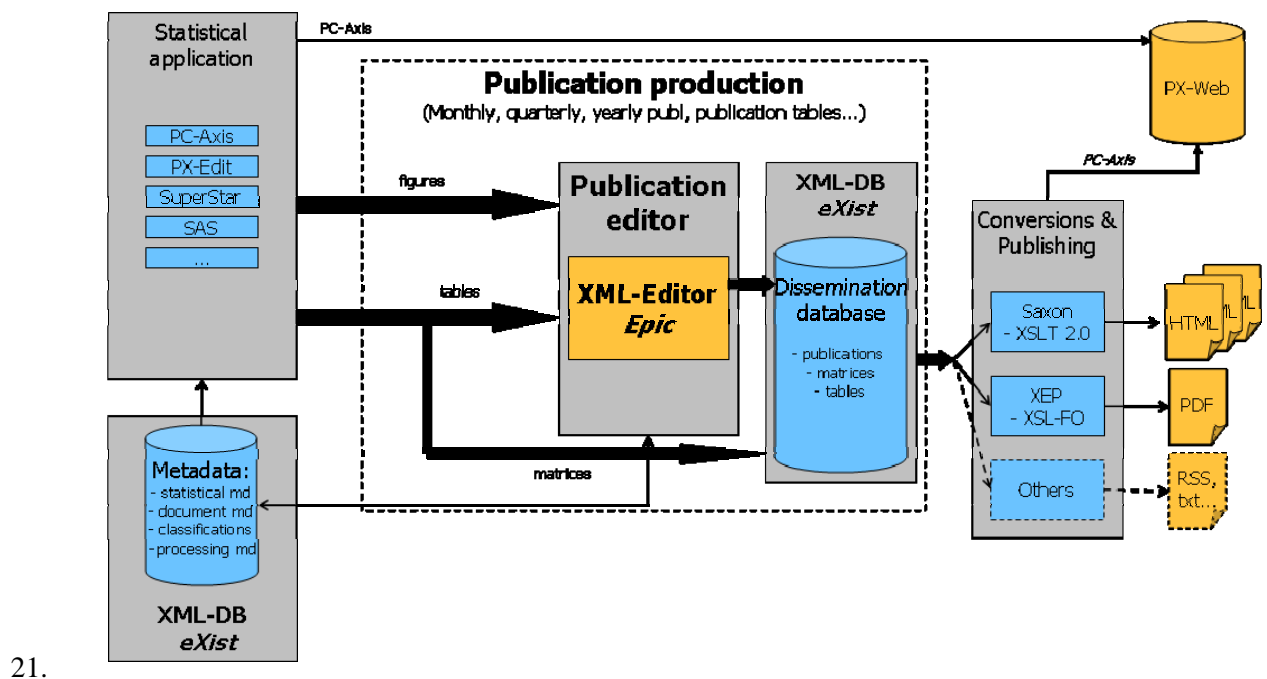


Figure 2. XML based dissemination of statistical data, publications and metadata

V. EXAMPLES

Statistical metadata for a variable "Disposable income"

Muuttuja:
Muuttujan nimi: Käytettävissä oleva tulo
Muuttujan nimi: Disposable income
Muuttujamäärittely: Tulonjakotilaston keskeisimpään käsitteeseen käytettävissä olevat tulot päästään, kun bruttotuloista vähennetään maksetut tulonsiirrot. Jos kotitalouden käytettävissä oleva tulo on negatiivinen, se on nolattu. Käytettävissä oleva tulo on kotitalouskohtainen.
Muuttujamäärittely: The key concept of disposable income in income distribution statistics is arrived at when current transfers paid are deducted from gross income. If the disposable income of a households is negative, it is zeroed. Disposable income is household-specific.
Operatiivinen määritelmä: Kotitalouskohtainen käytettävissä oleva tulo muodostetaan seuraavasti: Tuotannon tekijätulot (palkkatulot, yrittäjätulot, omaisuustulot) + Saadut tulonsiirrot - Maksetut tulonsiirrot = Käytettävissä olevat tulot
Operatiivinen määritelmä: The formation of the disposable income of households is as follows: Distributed factor income (Wages and salaries, Entrepreneurial income, Property income) + Current transfers received - Current transfers paid = Disposable income
Mittayksikkö: Euro

Tuloluokka Income	Ylempiä toimihenkilö Upper-level salaried employees	Alimpiä toimihenkilö Lower-level salaried employees	Työntekijä Workers
1. Palkkatulot 1. Wages	58104	32555	3
2. Yrittäjätulot 2. Entrepreneurial income	1001	746	
3. Omaisuustulot 3. Income from property	7656	2913	
4. Tuotannon tekijätulot (1+2+3) 4. Factor income (1+2+3)	66761	36214	3
5. Saadut tulonsiirrot 5. Current transfers received	4624	4898	
6. Bruttotulot (4+5) 6. Gross income (4+5)	71386	41112	4
7. Maksetut tulonsiirrot 7. Current transfers paid	22890	10054	
8. Käytettävissä olevat tulot (6-7) 8. Disposable income (6-7)	48496	31058	3

Figure 3. View of a statistical publication and statistical metadata in Epic editor

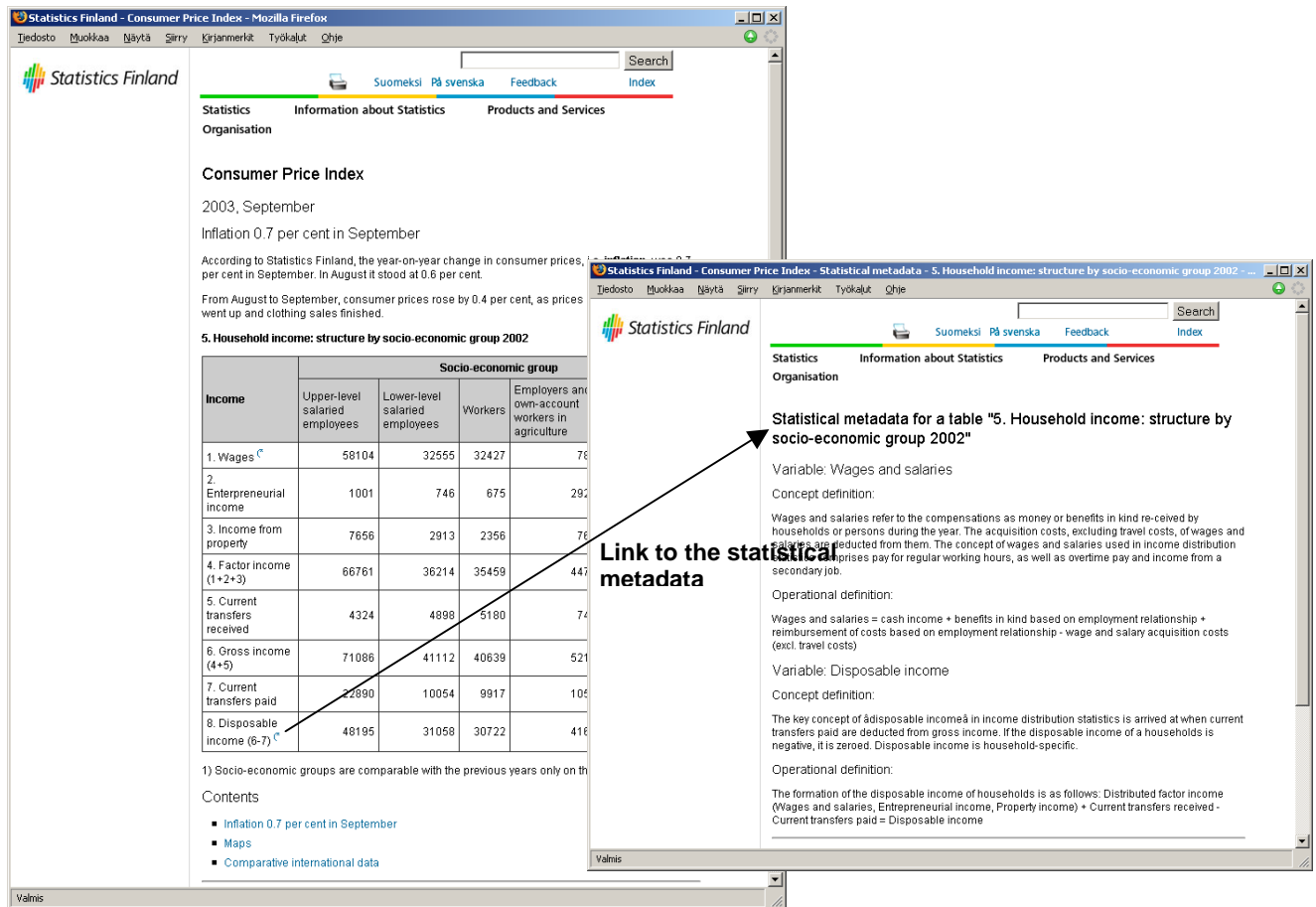


Figure 4. HTML output of a statistical publication with statistical metadata

**UNITED NATIONS STATISTICAL COMMISSION and
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UNECE Work Session on Statistical Dissemination and Communication
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Topic (iii) How to present metadata

**METADATA ON THE STATISTICAL PORTAL FOR THE BORDER REGION OF
SAARLAND – LORRAINE – LUXEMBOURG – RHINELAND-PALATINATE – WALLONIA**

Supporting Paper

Submitted by STATEC Luxembourg¹

I. INTRODUCTION

1. The so-called “Grande Région” is made up of very different regions. Four European countries are present in the region:

- Germany
- France
- Luxembourg
- Belgium (since 1994)

2. This region contains five different and highly disparate geographical entities:

- the entire French region of Lorraine
- the entire sovereign state of the Grand Duchy of Luxembourg
- the entire German Bundesland of the Saarland
- the entire German Bundesland of Rhineland-Palatinate
- the entire Belgian Wallonia region

3. This diversity within the Grande Région has given rise to a number of problems, requiring considerable effort to gather relevant and comparable statistical documentation. On that regional level, the statistical systems are still quite different. The task to make variables comparable is laborious and needs skilled and experienced staff. Complete, well-structured and easy accessible metadata is vital to guarantee a high transparency of the collected statistical information.

4. Since 1970, the statistical offices of the Grande Région have been working together in a permanent working group to gather comparable statistical documentation for this region. The directors of the Statistical Office of Saarland, INSEE (Lorraine), STATEC (Luxembourg), the Statistical Office of Rhineland-Palatinate and, since 1994, IWEPS (Wallonia) determine the group’s annual work programme. The results of this work can be viewed on the www.grande-region.lu website.

¹ Prepared by Guy Zacharias, guy.zacharias@statec.etat.lu.

II. PROJECT SUBSIDIZED BY THE INTERREG IIIC EBIRD² REGIONAL PROGRAMME

5. The future statistical portal will provide access to all harmonized economic and social data from this border region. Available from 30 November 2006, it will offer more than figures: maps, graphs, definitions, glossaries, useful addresses, bibliographical references, press releases and links will be grouped together on a single bilingual (French and German) internet site. The URL will remain unchanged from the former website:

- www.grande-region.lu
- www.grossregion.lu

6. This statistical portal will facilitate the duties of decision-makers and researchers, whilst allowing savings on funds granted for data research by researchers or consultants financed by regional, national or European authorities. The site also surveys the need for further statistical data, leading to initiatives to improve the Grande Région's statistical resources.

7. Statistical data rendered comparable by the group of statisticians are assembled thematically: territory and population, employment and unemployment, social life, income and prices, and the environment. Tables, administrative maps and graphs will be accompanied by detailed methodological notes. By selecting a title, variable, region, etc., users can display definitions, sources, units, nomenclatures and other metadata necessary to interpret the figures. Structured browsing will be assisted by a key-word search facility, comprising a thesaurus that will be updated according to the most frequently used terms by internet users.

III. THE METADATA

8. Metadata, that is, information on statistical data, are available at several levels:

- **basic information** (headings, unit, source, symbols, key words) are visible above or below the selected statistical table
- **additional information** (definitions, notes) are accessible via links in the table
- **complete methodological notes** are also accessible via the INFOTHEQUE menu

A. Basic information (see Figure 1 below)

9. Metadata essential for understanding the data presented in a table are immediately visible on the selected table. These are:

- the table's main title, and where applicable, a sub-title. The sub-title is occasionally used to provide additional information on variable features
- the unit in which the figures are expressed (number, ton, millions of euro, etc.)
- table headings in columns and rows (variable, region, etc.). Most of the tables are structured to display the five regions in columns and years in rows
- the source of data per region. This is the primary source of data, either the source organization or, if the data came from a statistical office, the relevant department or survey
- key words which have a link to the list of tables containing data on the same or related topic
- a key explaining special symbols used in the table or related metadata

² INTERREG IIIC is a programme funded by the European Union, which helps Europe's regions form partnerships to work together on common projects. e-based Inter Regional Development (e-Bird) is an initiative within that programme.

Figure 1: Basic information

Population totale						
Evolution						
Unité : Nombre						
Année	Saarland	Lorraine	Luxembourg	Rheinland-Pfalz	Wallonie	Grande Région
2004	1 058 853	2 330 504	453 300	4 058 737	3 388 220	11 289 614
2003	1 063 070	2 326 553	449 950	4 056 737	3 374 374	11 270 684
2002	1 065 390	2 322 250	446 175	4 051 567	3 363 405	11 248 787
2001	1 067 254	2 315 804	441 795	4 041 174	3 352 509	11 218 536
2000	1 069 684	2 313 838	436 570	4 030 400	3 342 987	11 193 479
1999	1 072 598	2 312 330	430 475	4 028 335	3 335 985	11 179 723
Source						
Saarland : Bevölkerungsforschreibung						
Lorraine : INSEE, Estimations localisées de population						
Luxembourg : population calculée par le STATEC et recensements						
Rheinland-Pfalz : Bevölkerungsforschreibung						
Wallonie : INS, Statistiques démographiques et recensements de la population.						
Mots-clés : démographie						
Légende						
- Néant			. Donnée non disponible			
: Donnée pas encore disponible			e Estimation			
c Confidentiel			(i) Non significatif			

B. Additional information (see Figure 1 above)

10. When the table heading is selected, a window opens containing a brief definition of the variables listed in the table. Where applicable, there is a link to more detailed methodological notes. To facilitate return to the initial table, these notes are displayed in a new window.

11. When the region name is selected, a window opens containing warnings and notes on regional particularities, in most cases linked to the statistical system of the relevant region.

12. When a figure inside a table is selected, a window opens containing notes on particularities of that specific figure.

13. Notes on regional particularities and information on specific figures in a table appear as footnotes on the printable version of the tables.

C. Complete methodological notes

14. A series of methodological notes, explaining in detail the concepts used, the degree of harmonization and regional differences, is accessible via two different pathways:

- through the definitions to which the table title link points (see Figure 1 and 2).
- through the main INFOTHEQUE menu, METHODOLOGY heading. This heading is structured according to the six main themes of the portal (see Figure 3 and 4)

Figure 2 – definitions

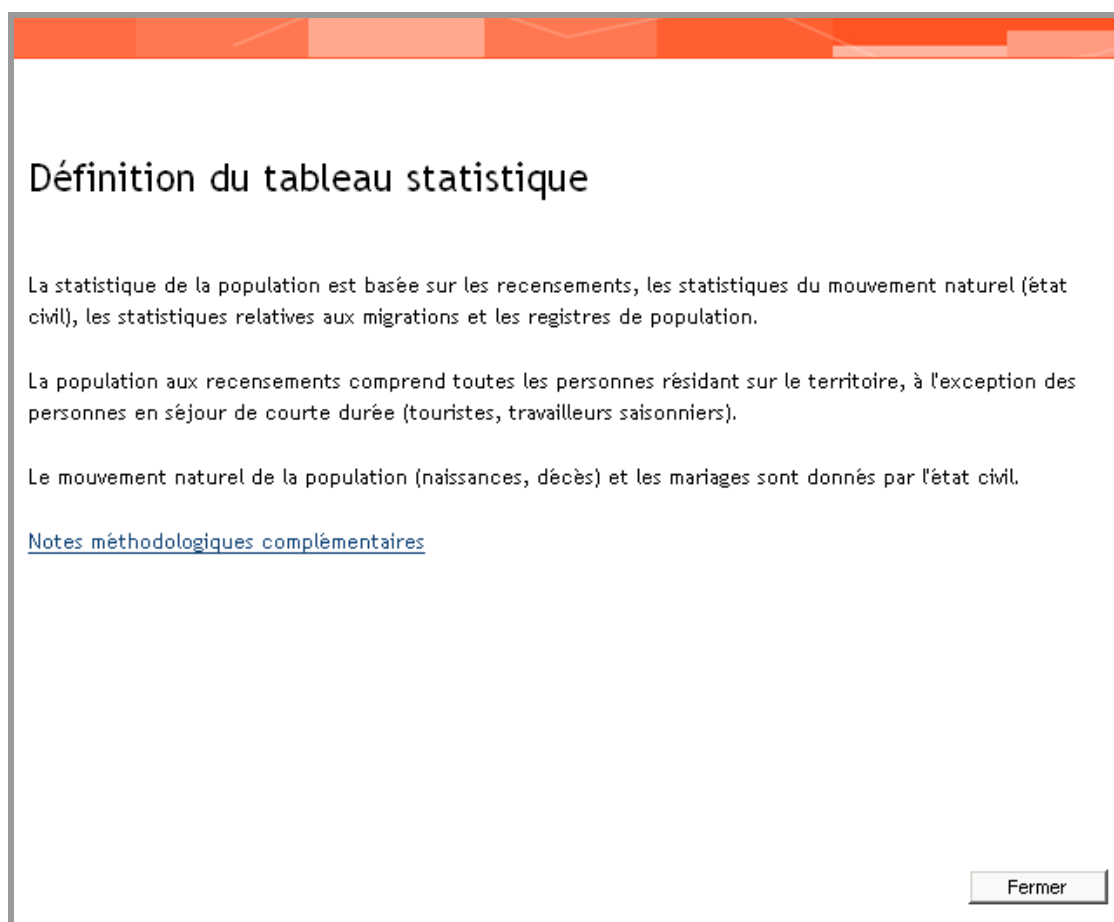


Figure 3 – methodological notes, menu

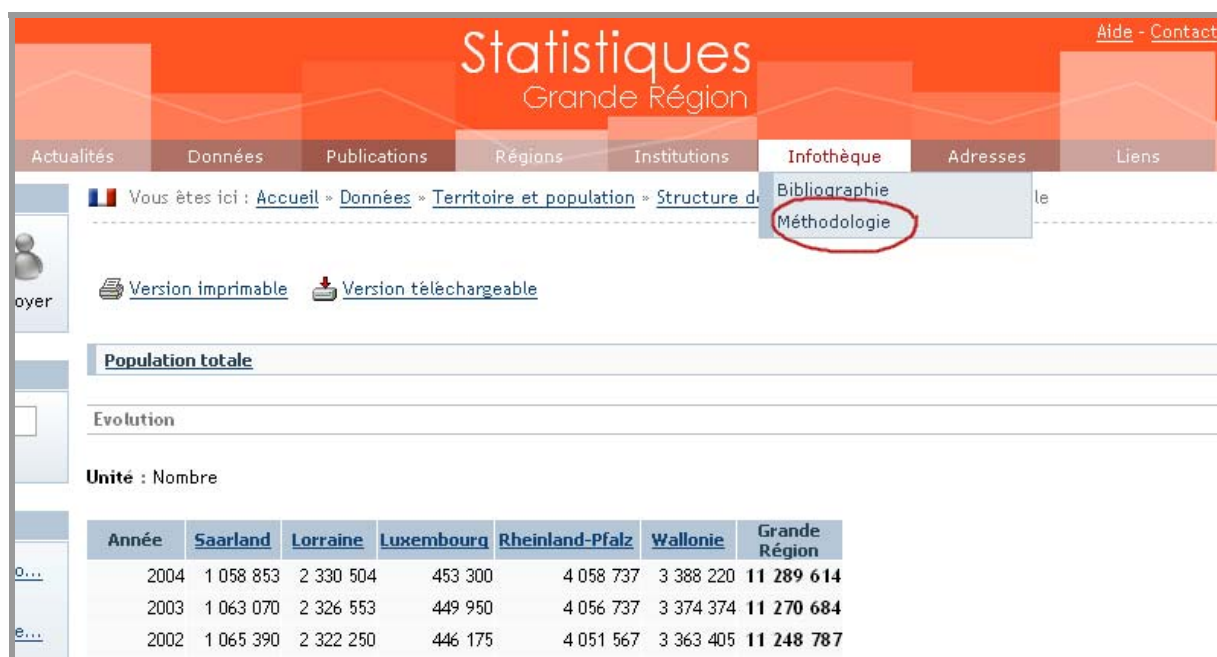
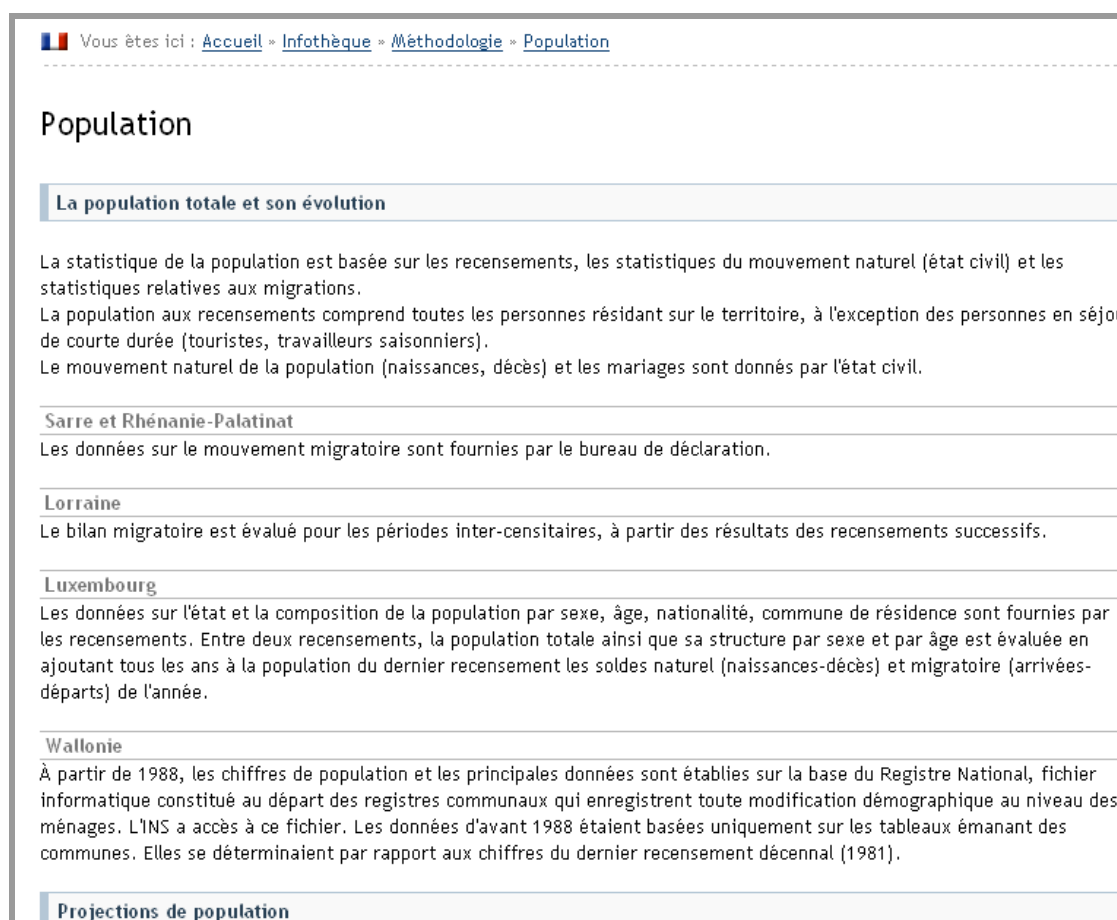


Figure 4 – methodological notes



- The results of tests and user feedback have shown that presenting metadata by directly linking it to tables and variables appears to be very user-friendly.

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Topic (iv) Managing revisions and version control to maintain credibility

HOW TO USE MISTAKES TO IMPROVE CREDIBILITY

Invited Paper

Submitted by Statistics Denmark¹

I. INTRODUCTION

1. I am aware that the title of this paper may sound provocative to the average statistician, bearing in mind that statistical errors and the publishing of wrong figures are regarded as a serious threat to the credibility of a statistical institution. How could such occurrences possibly contribute positively to credibility?
2. In Statistics Denmark we have considered the nature of statistical errors and as a result introduced a new policy on handling errors. This is partly a result of an unfortunate experience last year, when we received criticism in connection with the publication of corrected figures. Some major users argued that our website should be used much faster and more actively to inform of the problem. We judged that the criticism was deserved and decided to improve matters.
3. In this paper I will only deal with “real” errors, that is the publishing of wrong figures as a result of miscalculations, sloppy proof reading or other methodological mistakes on the part of the statistical institution. Euphemistically, this is often referred to by statisticians as “unscheduled revisions”. Hence, I shall not deal with the scheduled publishing of revisions or updates to previously published figures – a practice with its own credibility problems.
4. All statistical institutions make mistakes from time to time, but understandably they are not eager to admit it. In my seven years of acquaintance with statisticians I have met three standard reactions when it comes to correcting erroneous figures:
 - “Is this really necessary?”
 - “Do we have to publish it so visibly?”
 - “I would rather just call it an update”

II. THE PROBLEM WITH ERRORS

A. Knowledge is not gathered systematically

5. As a result of the tendency to suppress information on errors, knowledge of the occurrence of errors in statistics is generally not gathered systematically. We know very little about the causes of errors, how often they occur and under what circumstances. This has two consequences:

¹ Prepared by Leon Østergaard, loe@dst.dk.

6. Firstly, we lack the information necessary to learn from our mistakes. Information on the causes and conditions of errors is not spread in the organization for everybody to learn from, but kept on a local basis, at best. Similarly, I have not yet found a session on errors at an international statistical meeting where national statistical institutions can exchange experience on the causes of errors.

7. Secondly, we are not able to declare the quality of our statistical product on its most important parameter, namely correctness or reliability. We inform users of the release date, sample size and confidence limits of our statistics, but not of the – hopefully slim – risk that the statistics may simply be wrong by mistake.

B. Hiding mistakes puts credibility at risk

8. Statistical institutions may hide mistakes in various ways, ranging from simply never admitting to mistakes to the clever publishing of “revised” or “updated” figures in distant parts of the website. Whatever way is used, the credibility of the institution is put at risk, and there is a very simple reason for this.

9. Wherever human beings are active, mistakes are committed. This simple experience is shared by all human beings. Hence, if a statistical institution never admits to publishing errors, it has a problem with credibility in the eyes of the users.

10. The consequences for credibility may be even worse if you are caught in the act of trying to disguise an error as a “revision” or “update”, or if you just try to correct formerly published figures without telling your users about it.

11. My conclusion is that you really have no choice but to make mistakes visible, both to the users and the general public and internally in the organization. A mistake should be seen as an opportunity for the institution to demonstrate that errors are taken seriously, corrected at the earliest opportunity and corrected figures displayed very visibly to the users.

III. MAKING MISTAKES VISIBLE

C. Gathering information on errors

12. The great advantage of making errors visible internally in the organization is that it becomes possible to gather systematic information on the phenomenon – and to produce internal statistics on errors.

13. As every statistician knows, in order to make statistics you have to start with a classification. To make internal statistics on errors, you first have to classify errors according to their seriousness in the view of the users.

14. Secondly, you got to have reliable data. However, the data providers – in this instance the statisticians – are not inclined to report unbiased on their mistakes. Hence, you have to invent a way of gathering information that gets around this problem of reliability.

15. Finally, you have to publish the results, both internally in order to improve quality procedures and reduce the occurrence of errors, and externally to the users, so that they can get a true picture of the – hopefully slight – probability of your figures being wrong.

D. Publishing errors loud and clear

16. Publishing corrected figures is a task not different from other communication tasks. Firstly, you have to identify the target group – that is, the users most likely to have been misled by the erroneous figures. Secondly, you have to choose the channel or media most likely to reach precisely these users.

17. In the case of subscribed statistical information, the task may be fairly easy – you know exactly who have received the wrong figures and can forward an e-mail, a corrected publication or a corrected fact sheet to precisely these people with an explanation of the nature of the error.

18. It is much more difficult when you do not know exactly who has had the possibility of being misled – the erroneous figures may for example have been published to a broad audience on your website. In this case you have no choice but to announce the error and the correct figures very loud and clear on your website.

19. The purpose of this is twofold: Firstly, the users who have in fact been misled by the error will receive a good service. Their confidence in you will increase as they will expect to be told again if an error should occur another time. Secondly, the users not affected by the error will notice that you are announcing mistakes loud and clear. Their confidence in you will increase as well, as they can see that you are not hiding mistakes.

20. Of course this is only true to a certain extent. The error in itself and the public correction of the error does not add to the credibility of the institution. On the contrary, it may cause criticism from affected users in the short run. And if the number of admitted errors is very high, the credibility of the statistical institution will certainly be negatively affected - deservedly so! But in the long run, an error from time to time - which is corrected loud and clear - will increase the users' confidence that your statistics are usually or almost always trustworthy.

IV. A POLICY ON ERRORS AND MISTAKES

E. The classification of errors

21. In Statistics Denmark's new policy on the handling of errors, an error is defined as an incident creating a need to correct previously published statistics, without this being planned from the outset. We categorize errors in three groups:

- Blemishes
- Minor errors
- Serious errors

22. Blemishes are defined as errors not interfering with the basic understanding or use of the statistics by the users. Examples may be spelling errors or errors in dates or links. Errors in statistical figures can never just be blemishes.

23. Minor errors are defined as errors in statistical figures where it is unlikely that the users are misled, or where only minor groups of users are at risk of being misled. When judging this we take into consideration where in the statistics the error occurs – in the main conclusion or in a secondary table – whether the error is more or less obvious to the normal user, and at what time new and correct figures are scheduled to be published.

24. Serious errors are defined as errors where there is a real possibility that not insignificant groups of users are misled. The classification of errors as minor or serious is always discussed between the Dissemination Centre and the relevant statistical department. Decision on the matter is taken in agreement between the head of dissemination, the head of the relevant statistical department and the relevant director.

F. Policy for dealing with errors

25. Statistics Denmark's policy for dealing with errors came in force in March 2006. The policy deals with errors in statistics, defined as errors in published statistics, both printed publications and pdf-publications on the website. At the moment we publish electronically only in pdf-format, and all paper

publications are available in pdf-format on the website. For the time being our online databank Statbank.dk is exempted from the policy, but we expect to include it at a later stage.

a. Blemishes

26. Blemishes are only corrected online and no action is taken for printed versions of publications. When a blemish is discovered, it is reported to the Dissemination Centre, and we will correct the pdf-version as fast as possible, usually immediately. No mention is made in the publication of the correction.

b. Minor errors

27. Minor errors are corrected – again as fast as possible – in the pdf-version on the website. A note is made where changes have been made in the statistics saying “Corrected compared to the original version”. The date and time of the correction is stated underneath the original date of publication of the statistics – in the case of books in the colophon. The date and time of the correction is also stated in the list of published statistics on the website but no action is taken to actively forward information on the correction or the corrected version itself to known users, subscribers, etc.

28. No action is taken either as to the printed versions already distributed to users. In our major publications, however, it is clearly stated in the preface that if errors are discovered, a corrected version may be found at a specific web address. In the case of minor errors we normally do not alert potential users, but based on a concrete judgement, certain potential users may be alerted and have the corrected version forwarded, for example news agencies or professional users.

29. The balanced reaction to minor errors is due to the fact that by definition users are unlikely to be misled by minor errors. The need for correcting the error has to be held up against the wish not to disturb users unnecessarily with corrections not relevant to them.

c. Serious errors

30. If it is decided that an error is serious, the publication in question – most likely a news release – is immediately removed from the website. It is substituted by a message that an error has been found and the time when a corrected version may be expected. The chief statistician will be informed of the incident straight away.

31. Subsequently, the relevant statistical division and the Dissemination Centre produce a corrected version of the news release. The corrected publication is a complete copy of the original publication but it includes a short introductory paragraph on the error and how the error affects the statistics. The date and time of the correction is stated below the original date of publication. The headline will state that it is a corrected version, and the date and time of the correction is stated in the list of news releases on the website.

32. As fast as possible, a short note on the error and the time when a corrected version may be expected is placed at the front of our website, directly under the day's news releases. From here we link to the corrected publication when this is ready. This note remains on the front of our website for at least one full working day – sometimes longer.

33. All known subscribers to the erroneous news release will be told of the error and will get a copy of the corrected publication. An e-mail with similar content is forwarded to all major news media and news agencies and to a group of known analysts. The e-mail will contain a copy of the corrected news release if it is ready – but if it is not, we inform of the character of the error and the probable time of correction.

34. If a serious error is found in other statistical publications than news releases basically the same procedure is followed. If the error is confined to a minor part of a large publication, we may choose not to forward a reprint of the whole publication but only of the relevant pages. From case to case, we consider whether it is necessary to place a note of the error on the front of our website. If we are able to reach most of the users by other means, we may choose not to.

G. A system for collecting information on errors

35. A system has been developed in Statistics Denmark that systematically collects information on the number and nature of errors and makes the errors visible internally in the organization. The system consists of a reporting module on our intranet where the following information has to be given:

- Type of statistical publication at fault
- Seriousness of the error (blemish, minor or serious error)
- When was the error discovered and by whom?
- Type of error and responsibility (error in links, dates, calculations, dissemination or other types)
- Cause(s) of error
- When was the error corrected?
- Actions taken to correct the error (correction online, reprint, e-mail and so on)
- Actions taken to prevent future errors

36. The reporting of errors is the responsibility of our news release editor, to whom all discovered errors have to be reported immediately. The editor fills in the reporting form on the intranet when causes and consequences of the error are known and after consultation with the statistical department responsible for the statistics in question.

37. The uploading of the intranet reporting form causes a database to be updated with information on the error. At the same time, an internal e-mail is generated with information on the error. This e-mail is automatically forwarded to the relevant statistical department, to the editorial staff of our news releases, to the Head of Dissemination and to the Management, including the chief statistician.

38. In most cases, the errors are caused by the statistical division, but the Dissemination Centre may also be at fault. In theory, our news release editor may be tempted to conceal a possible responsibility by her or by the Dissemination Centre, but this would quickly be discovered due to the transparency of the whole process. The classification of errors and placing of responsibility may be changed by the chief statistician, which has happened once.

H. Measuring errors against a standard

39. When we implemented the new policy on the handling of errors, we had no idea of the magnitude of the problem. An investigation into last year's news releases seemed to indicate that there were serious errors in less than 1 pct. of the publications, but we had no information on minor errors or blemishes.

40. We decided that blemishes were not important to the users. What users needed was a standard for errors – serious and minor errors combined. With some hesitation we wrote into our latest “Strategy 2010” from January this year that in 2010 we aim to have reduced the occurrence of errors (total for serious and minor errors) to 1 pct. of our statistical publications, defined as news releases and Statistical News, both appearing in approximately 500 issues a year.

41. For the year 2006 we aim to find errors in not more than 1.5 pct. of our publications, which amounts to a maximum of 15 errors (total for serious and minor) for the whole institution. This is written into the internal contracts between the chief statistician and the statistical directors. According to their share of the total publication, each director is “allowed” a small number of errors in 2006.

42. By the end of July this year we had recorded 19 blemishes, 5 minor errors and 7 serious errors. If this figure can be projected into the whole year of 2006, we will end up with 33 blemishes, 9 minor errors

and 12 serious errors – well short of our target of a total of 15 errors (serious and minor). In round figures we seem to have blemishes in 3 per cent of our publications and errors in 2 per cent of them.

43. It is too early to conclude on the causes of errors, but of the 12 errors to date, 4 were caused by a change in methodology not thoroughly carried through in all steps of the process, and 3 were caused by faulty data deliveries from companies in the tourist industry. Among the blemishes, common problems were faulty links and old dates carried over from earlier versions of the statistics.

44. Measuring errors in Statistics Denmark has certainly increased the focus of staff members on errors and how to avoid them. Nevertheless it will take a lot of effort to reduce the occurrence of errors in our publications from 2 per cent now to 1 per cent in 2010. Making the errors visible is an important first step.

V. FUTURE DEVELOPMENTS

45. An error in a statistical publication may or may not be accompanied by a similar error in our online databank Statbank.dk, where all statistics in principle must be published at the same time as in the publications. We have developed a similar tool for registering errors in our online databank as is used for publications, and we use this for gathering information on the occurrence and cause of errors in databanks. Preliminary experiences suggest that the causes are often different from publications.

46. For the time being, our online databank is not included in our policy and standard for errors. When more experience has been gained, we plan to set a similar standard for errors in databanks as for errors in publications.

47. The purpose of error control is in the end of course to strengthen the credibility of the institution. As I said at the Henley-Workshop in February 2005 (WP 5), Statistics Denmark has been monitoring our reputation – including credibility – systematically since 2000. This is done through the so-called “Citizen Survey”.

48. In order to further improve the monitoring of our credibility, a new question on this subject will be added in this autumn’s Citizen Survey. In addition, credibility will be the subject of a new inquiry among registered users of Statbank.dk and among news media journalists. It is our hope that the new policy on dealing with errors will contribute to further improving the image of the organization in the long run.

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Topic (iv) Managing revisions and version control to maintain credibility

CORRECTIONS TO PUBLICATIONS AT STATISTICS SWEDEN

Supporting Paper

Submitted by Statistics Sweden, Sweden¹

I. INTRODUCTION

1. Statistics Sweden is currently in the process of drawing up guidelines for the handling of corrections to publications. One problem that has been identified is that corrections are handled in different ways in different parts of the organisation and by different people. In some cases this may be justified, given the material to be corrected, but often this is not the case. The fact that the corrections are made in different ways and that they are not always transparent to readers weakens the usability of our statistics.
2. Our goal is that users should receive information rapidly and consistently when corrections have been made. To achieve this, clear guidelines are needed which everyone in the organisation can easily follow. In this paper, we present some of the issues where a course of action has been determined. The work on this issue is being carried out at the same time as our publication schedule is being expanded, giving users the possibility to search all our publications and choose their sorting options. At the same time it is possible to incorporate specific routines concerning corrections in the technical system.
3. Given the volume of Statistics Sweden's publications, corrections must occasionally be made to published material. Corrections are a necessary but unplanned measure. Corrections should be made if there are errors in figures or commentaries and can be made to final and preliminary statistics. It should be made clear when a correction has been made. Only the corrected version of an electronic publication should remain on the website.
4. Decisions on the procedures for processing a correction can be made on a case-by-case basis. Here we describe the basic principles for corrections to Statistics Sweden's publications. Guidelines for how corrections are to be made should be included in the handbooks for all the different types of publications (press releases, databases, publications and tables on the website). When a correction has to be made, it is important that this is done as soon as possible. It is thus important that the person making the corrections has access to accurate guidelines for how the correction is to be made and the process to be followed – where the correction is made, who makes the correction, which persons are to be informed etc.

¹ Prepared by Anna Östergren, anna.ostergren@scb.se.

II. GUIDELINES

A. The basic rule is that inaccuracies in a publication are to be corrected

5. When an error has been detected, a decision has to be made as to the seriousness of the error and whether it is to be corrected. A basic rule is that, as far as possible, inaccuracies should be corrected. If the error is considered to be important for users, it should always be corrected. It is also important that we correct inaccuracies of a less important nature that, if they remain uncorrected, could give an unprofessional impression.

6. It is not always necessary however to correct inaccuracies of a less important nature. For example, a correction notice for a printed publication is not issued for a minor error, although such an error can be easily corrected on the website. If there is some uncertainty over the necessity of making a correction, the producer/author(s) should consult a representative from the Information and Publishing Department (IP).

B. All important corrections should be transparent to users

7. The producer, usually in one of the statistical production departments at Statistics Sweden, is responsible for the content of publications and for ensuring that inaccuracies are corrected and, where necessary, explained. The producer should always contact IP when a correction that is considered important for users is to be made. Staff working in IP need to have this information when they are liaising with the media and users, and IP can also provide advice on how corrections are to be made. In many cases, IP also takes the responsibility for publishing the correction.

8. Together with IP, the producer decides whether a correction is to be made transparent to users (logged) or whether it should be made without informing users. The most common procedure is that corrections are logged, one exception being for spelling corrections. Users' needs for correct information should be instrumental in determining if a correction is to be shown and corrections should always be shown when this is considered to be of importance for users.

C. Information on corrections is shown in a number of places

9. First page of the website

If a press release that is published on the first page of the website, has been corrected, this should also be shown on the first page.

10. Listings of publications on the website

A correction that is to be shown should always be visible when we list publications on the website, for example, under the heading "Publications". The listings may also be in the press room.

11. Information page

Each book and report has an information page on the website, preceding the publication itself. Information concerning corrections should be provided on this page.

12. Publications (reports, press releases, tables, databases)

There are different ways of making corrections related to the type of publication and whether it is a printed or web publication. Corrections can be made in:

- correction notices (printed publications),
- PDF files (web publications),
- html pages (tables, diagrams, press releases and web publications),
- database tables,

- periodicals: normally a correction would be inserted in the following issue. Corrections can be made to an electronic version as is done with books and reports on the web.

D. What should the correction notice contain?

- Correction notices for printed publications should contain the corrected information, date, formal information about the publication and possibly additional information about the correction. Templates should be provided for this.
- Corrections to electronic publications contain the date of the correction and possible supplementary information on the information page. The publication itself contains the correction possibly with accompanying information on the correction, as well as information on whether it is the first, second correction, etc.
- Tables and figures should be marked to show that a correction has been made. The date can be inserted in a footnote.
- Corrections to press releases should consist of the correction with possible explanatory information and the date.
- Corrections to database tables should contain the correction and the date.
- Regarding periodicals, the editor decides on an appropriate formulation. The correction should contain a reference to where the error is located together with the correct information.

E. Information on corrections is shown for varying periods of time

13. Information in the listings on the website on corrections remains for varying periods of time, depending on the type of publication. The publication itself also contains information about the correction for varying periods of time depending on the type of publication.

14. For publications that are issued regularly, the information on corrections should remain in the listings under the heading "Publications" for up to two weeks after publication of the new version. The information in the publication itself (pdf files) and on the information page is never removed. Information on corrections to monographs should not be removed from the listing or from the publication itself. A monograph is published on its own and there are no subsequent issues. It can thus be expected to have a longer life cycle than a publication which is issued regularly.

15. Corrections to periodicals are not shown in the lists under the heading "Publications", nor on the information page. (The system should, however, be such that corrections can be made in the same way as for books and reports.)

16. Information on corrections to press releases is removed one month after from all listings. However, correction notices in press releases should always be retained.

17. Information on corrections to tables and figures (html) on the website are removed when the table or figure is later updated. At this time the information is also removed from the listings.

F. Corrected publications and press releases should be archived

18. Producers in statistical production departments should supply two copies of archive printouts of the whole of the corrected version of books and reports that have not been printed but that have been published on Statistics Sweden's website. The Information and Publishing Department should supply a single copy of an archive printout of a corrected press release. All these printouts should be done using a special archive printer.

G. New notifications via e-mail that corrections have been made

19. Users subscribe to newsletters from Statistics Sweden via e-mail. Currently, a newsletter is sent out containing links to press releases and to reports. The newsletter is sent automatically when new press releases and reports are published. Users themselves may choose the subject areas or products for which they receive notification. The basic rule regarding corrections is that a new newsletter is sent to subscribers when corrections have been made to a press release or report. Notification of corrections should not be sent out automatically but only after an assessment of the seriousness of the error.

III. SOME EXAMPLES OF HOW CORRECTIONS SHOULD BE SHOWN ON THE WEBSITE

H. Books and reports

20. On the information page for the book on the website:
The corrected version should be marked on the information page of the publication in a separate field under the publication date, for example:

Corrected version 2006-02-09, Corrected version 2, 2006-02-13 etc.

21. In the listings under "Publications", the text Corrected version should be shown together with the date, for example:

Statistical Yearbook of Sweden 2006, corrected version 2006-07-05

22. PDF file of the publication:

The PDF file should contain the text *Corrected version or Second corrected version etc* on the title page under title information.

23. The PDF file should contain, if necessary, a description of the error. This is included in the summary under the heading *Correction + date*. If there is a correction notice, it is appropriate to use the same formulation.

I. Press releases

24. The text *Corrected version* and *the date* are inserted into a new text field in the press release template. The text should be shown in the row above the title of the press release.

For example:

Corrected version 2006-05-12

Service price index, 1st quarter 2006:

Price increases for services

25. The corrected figures/text in the text section of the press release are marked in bold followed by the text "corrected data" in brackets, for example:

55.9 (corrected data).

26. Corrections to tables in press releases are marked by an asterisk and the text "corrected data" is inserted under the table.

For example:

156 122 147 258*

** Corrected data*

27. Where the whole of a table or a figure is changed, the note "Corrected" is written adjacent to the heading of the table/figure. For example:

Employees aged 20-64 years on the regular labour market. Corrected

28. The corrected press release retains its original numbering.
29. If the press release is published on the first page of the website, the text *Corrected version* is inserted together with the heading. Example:
Higher import prices in December (Corrected version)
30. The text *Corrected version* and the date are also shown in all listings on the website, under Publications, in the press room and in the press archive.
31. If the correction needs an explanation, this is provided at the beginning of the press release. The text should be inserted in a new text/item field in the *content management system*. The information should have a different layout to distinguish it from the other text.

J. Tables and figures on the website

32. For corrections to tables and figures on the website, headings for figures and tables should contain the text *Corrected*. For example:
Ownership of shares in companies quoted on the Swedish stock exchange. Corrected
33. Changes in the tables are marked with an asterisk (*) in the table itself after the corrected data. This is then explained below the table. For example:

156 122* 147 258

* *Corrected data 2006-07-05*

34. In the listing of tables/figures under "Publication", the text *Corrected* is inserted.

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ECONOMIC COMMISSION FOR EUROPE
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UNECE Work Session on Statistical Dissemination and Communication
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Topic (iv) Managing revisions and version control to maintain credibility

**INFORMING THE USER ABOUT CORRECTIONS:
THE POLICY OF STATISTICS NETHERLANDS**

Supporting Paper

Submitted by Statistics Netherlands¹

I. INTRODUCTION AND SUMMARY

1. Statistics is about information. However, informing the users on scheduled and unscheduled revisions in official statistics is less common than it should be. National statistical institutes have a long tradition of treating their results as the fixed outcome of the statistical process. But in fact revisions in official statistics are not uncommon in many countries. Some revisions are scheduled and others are not. Scheduled revisions are based on a pre-announced release policy consisting at least of provisional results and final results. Unscheduled revisions or corrections are the results of errors within the statistical process or, for economic statistics, business data which are unexpectedly received too late to be included in the first estimates.

2. In 2005, Statistics Netherlands started a project to improve the information about corrections in statistics on our website. The starting point is that statistical institutes should promote transparency on corrections. We started a new heading on our website www.cbs.nl which was specifically devoted to corrections. Our website contains about 1500 multi-dimensional tables, comprising all core statistics of Statistics Netherlands. Every month, there are about 200 regular updates for a new time period and about 25 corrections on previously published results. Every correction is shown separately. For internal purposes, a management summary of all corrections is compiled, showing the number of corrections per organisational unit. This paper gives an overview of our policy, including a few statistics on the number of corrections.

II. REVISIONS AND CORRECTIONS

3. Until 2004, Statistics Netherlands made a distinction in its statistical output between two types of changes in statistics:

- *New statistics.* A completely new statistical table.
- *Revised statistics.* All other changes in statistical output, i.e. including a new month or year, a scheduled revision or a correction after a mistake has been made in the statistical process.

¹ Prepared by Huib van de Stadt, Head of publications and communication, hsdt@cbs.nl.

Both internally and externally, this created some problems. For our users it was unclear why statistics were changed. Was this simply the result of a scheduled statistical process or was it the result of mistakes and errors made by Statistics Netherlands? In January 2004, we received some unfavourable press coverage after unemployment statistics for a certain period were changed the next month. It was therefore decided to improve the information about the nature of the changes on our website.

4. In April 2004, a new classification of changes in statistical output was made and approved by our Board of Directors. Four types of changes were distinguished:

- *New tables*. A completely new table, or a table with new variables or new classifications of existing variables (renewed table).
- *Updated tables*. A new time period is added (a month, a quarter or a year), but nothing else is changed.
- *Scheduled revisions* of tables. A revision of statistical data based on a release policy. A release policy is a pre-announced publication schedule of provisional and final data.
- *Corrected tables*. A revision of statistical data *not* based on a release policy.

5. Hence, in the new classification a clear distinction was made between revisions based on a release policy and revisions not based on a release policy. Corrections are revisions not based on a release policy. Usually they are the result of new information which becomes available unexpectedly: a new statement of a company, or a new version of a register. In other cases an error has been made in the statistical production process: errors in the software, wrong versions of the database, etcetera. As we all know from experience, these kinds of errors cannot be avoided entirely.

6. In the course of 2004, the new classification was introduced. All official output of Statistics Netherlands is placed on our website www.cbs.nl. For every new table to be placed on the website, the statistician has to classify the change into one or more of the four categories mentioned above. The publication department checks the table and the classification and places the table on the website.

7. As from 2005, every correction introduced includes a short explanation provided by the statistician involved to improve transparency further. This explanation is also placed on our website. So we have a list of explanations of corrections which is available for all users of our statistics. In order to keep this list within a reasonable length, explanations are deleted after one month. The following link shows the list of corrections: www.cbs.nl/nl-NL/menu/cijfers/statline/correcties/default.htm. Unfortunately, this part of our website is not translated into English. As an example, we have included the list of July 2006 below.

Centraal Bureau voor de Statistiek

Home | Thema's | **Cijfers** | Publicaties | Methoden | Informatie voor | Over het CBS | English | Sitemap

Home > Cijfers > StatLine databank > Correcties

Kerncijfers

- Cijfers per thema
- Recente cijfers
- StatLine databank**
- Toegang tot StatLine
- Correcties**
- Niet beschikbaar
- Informatie over StatLine

StatLine correcties

Deze pagina bevat informatie over correcties op in StatLine gepubliceerde cijfers. N.B. reguliere bijstellingen van cijfers in het kader van een vast publicatieschema worden niet op deze pagina vermeld. Deze reguliere bijstellingen betreffen met name het vervangen van voorlopige cijfers door definitieve. Voorlopige cijfers zijn herkenbaar in StatLine doordat ze zijn gemarkeerd met een "*".

25-07-2006	Emissies naar lucht
25-07-2006	Emissies naar lucht; mobiele bronnen
25-07-2006	Emissies naar lucht; wegverkeer
25-07-2006	Gemeenterekeningen, balans 2004
25-07-2006	IPCC-emissies naar lucht
25-07-2006	NEC-emissies naar lucht
19-07-2006	Maandcijfers binnenlands spoorvervoer
19-07-2006	Maandcijfers internationaal spoorvervoer
18-07-2006	Detailgegevens
18-07-2006	VO; leerlingen en geslaagden
15-07-2006	Vestigingen
15-07-2006	Demografie van bedrijven
14-07-2006	Kerncijfers transport
14-07-2006	Kerncijfers Bedrijfsleven
14-07-2006	Milieudienstverlening
13-07-2006	EMU-saldo en EMU-schuld; Internationaal
07-07-2006	Energie en waterleiding met honderd of meer werknemers
07-07-2006	Energie en waterleiding, alle bedrijven
07-07-2006	Kerncijfers Bedrijfsleven
07-07-2006	Kerncijfers dienstverlening
07-07-2006	Kerncijfers groothandel en handelsbemiddeling
07-07-2006	Kerncijfers Sociale Zekerheid
07-07-2006	Omzetspecificaties dienstverlening
06-07-2006	Welzijnswerk en kindercentra
04-07-2006	Verpleeghuizen

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- Voeg toe aan favorieten
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- Printversie
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Snelkoppelingen

- StatLine databank
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- RSS Newsfeed
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- Huuraanpassing
- Vacatures bij het CBS
- Conjunctuurklok

Dossiers

- Alloctonen
- Vergrijzing
- Ondernemingsklimaat
- Meer

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8. We think that our treatment of corrections is meaningful and in line with the views of international organisations. The concept of scheduled revisions is also used in the Statistical Data Description System (SDDS) of the IMF and in the RAMON-system of Eurostat. The recent OECD newsletter of July 2006 also stresses the importance of explicitly showing the magnitude of revisions. The eDamis-system of Eurostat is used for nearly all data flows from Statistics Netherlands to Eurostat. It has a provision for the replacement of data flows in the case of errors and revisions, but a systematic distinction between several types of replacements is not made.

III. STATISTICS ON STATISTICS

9. Statistics Netherlands has one central on-line database for all its statistical output. The database is called StatLine and is accessible to the public through our website www.cbs.nl. One central database has several advantages. A maybe somewhat unexpected advantage is that it makes it much easier to compile management information on the production of statistics, and also on the number of corrections and revisions. Statistics on statistics, so to speak.

10. Table 1 summarizes the content of and the changes in the database StatLine for the first half of 2006.

Table 1. StatLine, January-June, 2006

	Business statistics	Social and regional statistics	Macro-economic statistics	Total Statistics Netherlands
Number of StatLine tables, December 31, 2005	563	704	255	1522
Number of StatLine tables, June 30, 2006	608	735	256	1599
New tables (including renewed)	38	59	43	140
Updates	541	407	406	1354
Scheduled revisions	40	16	29	85
Corrections	83	56	18	157

11. Table 1 shows that at the end of 2005, the official output of Statistics Netherlands consisted of 1,522 multi-dimensional tables in StatLine. During the first half of 2006, this number increased to 1,599. We had 140 new tables in this period, including about 60 tables which were only renewed (new variables or classifications in existing tables). Table 1 further shows that 1,354 tables were updated adding a new month or year (a monthly table usually counts for six, because the table covers six months). We had 85 scheduled revisions and 157 corrections.

12. The number of corrections is not negligible. In 157 cases in six months we had to make a correction, because something had gone wrong. As mentioned before, part of these corrections was made because somewhere else things went wrong (new information from companies or holders of registers) and another part is because things went wrong within the production process of Statistics Netherlands. For the user, this distinction is not very important, because the fact that there is a correction is the only thing that matters. For us, the distinction seems more important. However, one might also argue that a sound production process takes into account the fact that information is becoming available all the time.....

13. To conclude this section, we also give some statistics on corrections in the data flows to Eurostat by the eDamis system. In the first half of this year, 489 data sets were sent to Eurostat. From these data sets, 314 were new and 175 were replacements of previous data flows. These replacements include both large corrections (in data) and small corrections (changes in texts). Still, the number of replacements is fairly large.

IV. CONCLUSIONS

14. Making errors is human. The statistical production process is no exception in this respect. In the Netherlands, we have extended the public information on errors and corrections in statistics. This policy has started in 2004 and has now been completed. All corrections are shown and explained on our website.

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Topic (iv) Managing revisions and version control to maintain credibility

**FIXING MISTAKES ON THE INTERNET:
A CASE HISTORY AT STATISTICS CANADA**

Invited Paper

Submitted by Statistics Canada¹

I. INTRODUCTION

1. Over the course of a year, statistical agencies release a phenomenal amount of data. At Statistics Canada, our official release bulletin, *The Daily*, contains on average more than 1,300 data releases a year, not to mention electronic links to myriad tables and charts in the scores of modules elsewhere on our website.
2. For the most part, we get things right. If a user were to do an electronic search of *The Daily* for “erratum”, he would get only 18 hits between January 1, 2000 and July 21, 2006. This doesn’t count mistakes in other Agency products such as publications or studies, but it does send a signal to our clients, and the public, that the Agency’s goal is accuracy.
3. This is crucial. One of the foremost challenges for a statistical agency is public confidence in the integrity of its data. Few users can validate directly the data released by a statistical agency. Instead, they rely on the source of the information. Consequently, the value of statistical information hinges directly on the credibility of the statistical agency, and this credibility is extremely fragile. A single headline can cripple an agency’s integrity in the eyes of the public. This, in turn, may make collection more difficult, if the organization loses public respect.
4. Despite the very best of efforts, mistakes happen, and when they do, the Internet confronts statistical agencies with some unique problems. For example, given the complexities of the Internet, how can agencies best change or revise information that they have already posted? How can they make sure that the new information gets communicated to all its clients? How do they handle “minor” errors as opposed to “substantive” errors, and who makes the decision on the severity of the mistake anyway?
5. The challenge is to handle each situation quickly and effectively. Since January 1, 2005, Statistics Canada has encountered a number of difficult situations concerning data errors that were published in *The Daily*. These circumstances resulted in adverse media coverage that called into question the integrity of the Agency’s economic data.
6. This paper will examine the nature of some of these errors on the Internet, and how Statistics Canada handled the situation.

II. THE DAILY: A SHIFT IN DYNAMICS WITH OUR READERS

7. *The Daily* is Statistics Canada’s first line of communication with the media and the public. It is Agency policy that every new product or dataset must be announced to the public through *The Daily* in

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one form or another, whether through an analytical news release or simply a listing for a new product. Statistics Canada has published *The Daily* for 73 years. The most fundamental change in the publication occurred in 1995 when it made the transition from a paper product to an Internet product. This transition changed the very dynamics of our relationship with our clients.

8. In retrospect, the days of the paper product were relatively simple and straightforward. Copies of *The Daily* were distributed each day to journalists, either by fax or through the office of Parliamentary Press Gallery. To obtain favourable media coverage, Statistics Canada developed a working relationship with journalists, who were very much the “gatekeepers” of access and meaning between the Agency and the general public. (Although the target audience of *The Daily* was journalists, copies were also distributed to other clients, such as financial analysts, banks and economists.)

9. The point is, the circulation of *The Daily* wasn’t extensive, and Statistics Canada knew to a large extent who its readers were. When an error occurred, we could notify our clients right away. For purposes of the publication itself, subject matter analysts prepared an “erratum”, which was published as soon as possible after the offending release.

10. The Internet changed the dynamics of dealing with *The Daily*’s clients. As an online product, *The Daily* is accessible not just by the media, but by anyone with a computer and access to the World Wide Web. Within minutes of release time at 8.30 a.m. Eastern Standard Time, thousands of readers around the world may have accessed a data release. As a result, the speed and capacity of the Internet have eroded the “gatekeeping” role of the media. Although they still play a key role, newspapers and wire services are no longer the only vehicle for distributing factual information from the Agency.

11. This, in turn, made life far more complicated for the Agency. This is because it now has less of a relationship with its readers than ever before. There are many thousand visitors to our website who remain anonymous. The Agency is further removed from users as individuals than it has ever been.

12. As a result, the logistics of correcting an error become daunting. We can correct an error online. But we have no means of communicating directly with everyone who may have read an erroneous release, and we have only limited hope that everyone who had read it will see any eventual correction. It’s no wonder that the Internet seems to magnify even seemingly small errors.

13. Corporate policy requires Statistics Canada to “inform users of the concepts and methodology used in collecting, processing and analyzing its data, of the accuracy of these data, and of any other features that affect their quality of ‘fitness for use’.” However, there is no consistent procedure for following this policy. (One is under consideration and will be explained later in this paper).

14. In the following sections, we’ll examine situations that arose last year at Statistics Canada, and how they were handled.

II. INTERNATIONAL TRADE DATA: “THE PERFECT STORM”

15. On January 12, 2005, *The Daily* published a routine monthly news release on international merchandise trade data for the reference month of November 2004. As it turned out, the release was not so routine. It kicked off a chain of events that was to culminate in national media coverage calling into question the integrity of much of Statistics Canada’s economic data.

16. According to the release, Canada’s merchandise imports, particularly from the United States, tumbled in November, resulting in a near record high trade surplus. The plunge in imports was attributed to two factors: the soaring value of the Canadian dollar compared with its US counterpart, and a drop in the volume of goods.

17. Unfortunately, the main culprit wasn’t the dollar, it was technology. Canada Border Services Agency, which supplies Statistics Canada with customs records on imported merchandise, had shut down their system for one day to introduce some modifications. Import transactions recorded on that particular day accounted for 8% to 10% of all transactions for the entire month, four times the volume on a regular day. Because these data were missing, the November trade surplus was low by \$2 billion.

18. Officials in Statistics Canada’s International Trade Division said the import data raised eyebrows right from the beginning. They said the division bent over backwards to confirm the data. It discussed them with trade officials in the United States, as well as with large Canadian importing companies and approached the Border Services Agency several times.

19. Ten days after the release, the division discovered that one day's data were in fact missing. The division concluded immediately that it had to fix the problem, and fast. On January 31, 2005, it published a seven-paragraph release in *The Daily*, issuing "revised data" for merchandise imports for November 2004. It said: "A technical problem at Canada Border Services Agency led to the transmission of incomplete customs records to Statistics Canada for November." Normally, the November data would have been revised with the release of the December data, on February 10th, but, given the size of the problem, an exceptional earlier release was distributed.

20. The mistake had immense repercussions, and not just for Statistics Canada's credibility. In a statement, the Bureau of Economic Analysis at the US Commerce Department said it uses Statistics Canada's estimates of imports of goods from the United States to prepare estimates for American trade in goods and services, and for the US gross domestic product. Statistics Canada's correction would have a US\$ 1 billion impact on calculations of trade in American goods and services for November, and on calculations of US GDP for the fourth quarter of 2004.

21. "Disappointing GDP? Blame Canada" said a headline in the *Toronto Star* of February 1, 2005. The journalist wrote: "A major blunder in a Statistics Canada report sent the world's financial markets scrambling to revise upward what was originally disappointing U.S. economic growth numbers."

22. As a Statscan trade analyst put it later: "It was the Perfect Storm."

III. CULTURE DATA: 'NO CRIME' IN MAKING A MISTAKE

23. In June 2005, international trade statistics were again front and centre in another difficult, and complex, situation over errors. This time, the releases concerned data for international trade in culture goods for the reference years 2003 and 2004. They appeared in *The Daily* of March 29, 2005 and May 19, 2005, respectively.

24. Almost immediately, questions were raised about the data, both from subject matter people at Statistics Canada and the government department that sponsored the project. *The Daily* of May 24, 2005 contained a short erratum stating that errors were made in the original release. However, questions about the data were still being raised.

25. As it was explained later, virtually every data point in the original two releases was incorrect. The problem was traced to a processing error committed by a relatively new, inexperienced employee.

26. Between June 3 and June 13, 2005, a series of e-mails circulated among staff members at Statistics Canada and their policy department sponsor about what action should be taken.

27. At one point, the sponsoring department wrote: "It is our view that there is no 'crime' in making a mistake. The offence is the wilful promulgation of that mistake, knowing that people are downloading incorrect data, and continuing to do so for some days after the Bureau (Statistics Canada) discovered the errors." He said communications branches in both departments had their work cut out ahead "to restore full confidence in cultural statistics".

28. On June 14, the two offending news releases, along with the May 24 erratum, were all removed from Statistics Canada's website. They were replaced by a notice that the releases had been recalled due to a technical problem in the data extraction process. This had resulted in errors in many values for the import and export for culture goods for the years 1996 to 2004.

29. "We will replace the news releases once new data and analysis have been produced and validated thoroughly," the notice said. "We deeply regret any inconvenience this error may have caused our project partners...."

30. Up to this point, the situation had not attracted any media attention. But someone was obviously watching.

31. On June 27, 2005, Access to Information officials at Statistics Canada received this request from a journalist: "All records of investigation into errors in data on the international trade of culture goods, released in the *Daily* of March 29, 2005, May 19, 2005 and May 24, 2005, including e-mails, memos, correspondence with Canadian Heritage, briefing material for the Chief Statistician and minister, including draft or interim versions or final versions not yet complete." A package was delivered to the journalist on July 25, 2005.

32. Six days later, one of Canada's two domestic news agencies put the story on its news wire. The lead paragraph said: "For the second time this year, Statistics Canada has released erroneous trade numbers on its website, further undermining the credibility of federal statistics. And the agency knew about the latest batch of bad numbers more than 10 days before it alerted the public and media to the problem...."

33. The article also referred to the Agency's problems over the trade data for November 2004. The headline in the *Winnipeg Sun* on August 2, 2005: "Statscan goofed again."

IV. REPERCUSSIONS: A SCEPTICAL MEDIA

34. Incidents such as these have had major repercussions on Statistics Canada's image in the nation's media. All of a sudden, the Agency's data were no longer being taken at face value by journalists.

35. This became evident in April 2006 after the Agency removed a news release from its website that it had published the previous month. The release concerned estimates of labour productivity growth in the business sector between 2004 and 2005.

36. The text was lifted after analysts discovered they had not properly counted the number of working days in 2005. As a result, labour productivity in Canada's business sector increased much faster than initially reported.

37. The director of the responsible division explained to journalists that revisions are usually made in June. However, the magnitude of this was so big that the agency decided to make the change immediately. Instead of calling it a revision, it was being treated as a correction.

38. This incident returned to haunt the Agency in June when it issued labour force data showing that Canada created 97,600 jobs in May alone, more than the United States, which has a population 10 times larger than Canada's.

39. Financial analysts expressed strong reservations about the growth, but a spokesman for the Agency's Labour Force Survey said it had thoroughly checked the figures.

40. Even so, a journalist for Reuter's news agency phoned Statistics Canada's Media Hotline demanding to speak with someone in authority who could comment on "high-profile stumbles" at the Agency, such as the labour productivity data.

41. An assistant chief statistician told the journalist that these problems had nothing to do with the agency's data collection methods.

V. LESSONS: WHAT CAN WE LEARN?

42. No statistical agency is perfect. But when it makes a mistake, there are some appropriate responses it might make. At Statistics Canada, these include:

1. **Build trust through transparency:** A statistical agency gains credibility by admitting its mistakes in an open and timely manner. That is what International Trade Division did in the case of the faulty import data. The division took its lumps, but as an official said: "We were very transparent and open. We reacted quickly. I think we did a very good job once the error was identified."
2. **Determine the severity of the error:** Statistics Canada now has certain procedures in place with respect to erroneous texts in *The Daily*. The first is to determine the severity of the error, which is done in consultation between Communications and Library Services Division and subject matter analysts. Both should apply their own criteria to spell out the differences between minor and substantive errors. These differences might well depend on the context. In some contexts, a change of "0.1" can be material. On the other hand, a 25% error in a price index that, because of low weight, only moves the all-items consumer Price Index by 0.01 points may not be material. Some errors may move markets, others may not.

3. **Prepare a response plan:** The generally accepted plan at Statistics Canada is to remove a news release from *The Daily* if the error is considered to affect findings in a material fashion. (Releases in *The Daily* are archived back to 1995.) The news release is pulled and replaced as soon as possible. In instances in which an error is deemed minor, it could be handled by an erratum in a subsequent edition of *The Daily*.
4. **Notify the media and stakeholders:** Despite their reduced role as “gatekeepers,” the media still play an important role in conveying information to the public. In the event of a substantive error, the Agency’s Media Relations officials notify the media immediately, in particular the two domestic news agencies, and if necessary, journalists with financial wire services, such as Reuters or Dow Jones. This could be the case even for a single erroneous data point, if it is felt that the number is key to a story line. It is the responsibility of subject matter people to keep their stakeholders, such as survey sponsors, informed of developments.
5. **Question unusual data:** Subject matter people and *Daily* editorial staff are paying much more attention to unusual data. If employment data are unusually high, or exhibit behaviour contrary to a longstanding trend, questions are immediately raised. The motto should be check, check and check again.

43. Errors aren’t just the domain of *The Daily*. Every year, author divisions authorize the loading of hundreds of electronic publications onto the Internet. However, there is no corporate process at the moment for correcting errors in these electronic publications. Accordingly, the Agency has established a project to develop such a procedure.

44. The goal is to ensure our external and internal users are made aware of important corrections to the data and analysis; to ensure author divisions are aware of their responsibilities with respect to corrections; to ensure consistency across the organization; and to comply with the Agency’s policy on informing users of data quality and methodology.

45. Data errors provide similar challenges for other Agency products: for example CANSIM, Statistics Canada’s huge databank, which does have a battle plan in place. When the CANSIM database unit is notified of a substantive error, it freezes access to the relevant tables on the Agency’s website. CANSIM has a mailing list of prominent clients, and in the event of an error, they receive notification via an e-mail that access to certain tables has been withheld. They also receive notification when the data have been corrected and the tables replaced.

46. Similarly, in the event of errors, Statistics Canada can temporarily withhold access to products such as “smart pubs”, and to tables on other modules on its website, such as “Canadian Statistics”, that are generated from CANSIM.

VI. CONCLUSION

47. This paper has summarized certain events during 2005 involving errors in key data releases that led to adverse media coverage. These news reports called into question the integrity of Statistics Canada’s economic data.

48. Events such as these can have a lingering negative impact on the credibility of a national statistical agency. Without a doubt, a single headline can indeed cripple an agency’s integrity in the eyes of the public. We cannot afford to take the public’s confidence in our data for granted.

49. At Statistics Canada, the steps taken last year to correct erroneous releases, albeit painful at times, have nevertheless led to a stronger understanding at the Agency about the nature of the Internet, and its impact on our relationship with our clientele. It is accepted that a statistical agency should be prepared to respond appropriately to errors, without undue delay.

50. And finally, there is a keener understanding about a fundamental responsibility of a statistical agency. Its reputation is only as good as its data – so get it right in the first place!

**UNITED NATIONS STATISTICAL COMMISSION and
ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS**

UNECE Work Session on Statistical Dissemination and Communication
(12-14 September 2006, Washington D.C., United States of America)

Topic (iv) Managing revisions and version control to maintain credibility

Presenting updates and revisions of statistics to a sceptical audience

Supporting Paper

Submitted by Office for National Statistics, United Kingdom

“ . . . But actually, he thought, as he re-adjusted the Ministry of Plenty’s figures, it was not even forgery. It was merely the substitution of one piece of nonsense for another . . . ”

– George Orwell, Nineteen Eighty-Four

I. INTRODUCTION

1. Revisions are an everyday part of statistical life. There are very few series that are collected where the statistician can say definitively that this is the number and it will never change – particularly where survey data are involved. There are always levels of ‘confidence’ (this might translate in common parlance to ‘degrees of doubt’). Series of data are published in the full knowledge that later and better data may well arrive that change the published number.

2. So there is the age-old headache of the trade-off between timeliness and accuracy. Should you publish what you know at a given point or wait in the expectation that some improved material will arrive? The clamour today is for everything to be available ever more instantly; so the pressure on the statisticians grows greater by the day.

3. There is no surprise to anyone in this. Statistical Institutes the world over will be agonising over this trade-off for aeons to come. The problem is many of the casual users of statistics really have no grasp of the argument. This general lack of sympathy for normal statistical processes is leading to a worse problem – the lack of confidence and trust in statistics over all. In the UK we are serving up our statistics to a very sceptical audience – not just the professionals and the media but the public as a whole. Adding revisions into the mix only serves to increase the acidity.

II. THE BASIS OF FAITH

A. The confrontational media

4. The starting point for the crisis in confidence is very often the media – and, in particular, the written media. In early July 2006, for example, the *Financial Times* published a table showing “Why British statisticians have a PR problem”.

¹ Prepared by David Marder (david.marder@ons.gsi.gov.uk) Views expressed are personal and to stimulate discussion; they do not necessarily represent policy of ONS.

5. It highlighted a research report by analysts Goldman Sachs which looked at average quarterly growth rate annualised for the period 1999 to 2004. The FT's economics editor took the view, based on this, that British statisticians were more likely to underestimate the strength of their economy than those in the rest of Europe and the United States.
6. Initial estimates of GDP for the period suggested the US economy had grown by a full percentage point more than the UK but revisions showed growth in Britain was identical to the US. Such revisions, the FT argued, were selling Britain short and giving it bad public relations. It was the initial figures (first estimate) which gained the most publicity and formed the opinions of key people about the economy's performance. So the lasting impression was 'bad news' that the UK was lagging behind, and that was not sufficiently balanced when the revised data came out showing a very different picture.
7. *The Business* was less polite: "Britain's official statistics agency is under fire this weekend for producing some of the least accurate growth statistics in the world".
8. This type of criticism is nothing new; a year previously a renowned stockbroker said: "the scale of the revisions to the ONS statistics almost invites nihilism with respect to the possibility of knowing what is happening to the real economy. It is becoming hard to avoid the conclusion that from a methodological perspective, there is a near-zero probability that any particular generation of ONS statistics can say anything useful about the real world – or even future generations of official statistics."
9. Ouch! All this came out at the same time as the results of research into public confidence in official statistics showing six in ten people didn't believe government statistics. Added to that the same proportion didn't believe statistics were produced without political interference.
10. What did we fight back with? One the face of it, not much, but the issue stimulated thought within the organisation and elsewhere and later in the paper I will indicate some of the other ideas that are being developed. Immediately though, a short letter to editors explained the usual line 'revisions are not a result of errors, but instead reflect the availability of later and better data', supported by some comments that Britain actually compared well with other European countries for revisions and also brought out key economic statistics faster than any.
11. This cut little ice and nor did a more technical article written for the FT which explained the issues of re-basing, simplifying assumptions and how an estimate of activity in the construction sector had been based on the early-results of a survey and a forecasting model. More complete findings from the survey had led to an upward revision.
12. The revisions issue attracted the attention of Parliament and former National Statistician, Len Cook, told a Parliamentary Committee: "We have a very early first estimate of GDP; it comes out some 30 days after the end of the quarter. It is some 20 days ahead of any other European Union country, and that is a choice that has been deliberately made in the UK."
13. He pointed out that if the whole of the EU followed the plan to standardise on 46 days the UK would have an extra 16 days to improve its estimate but for the City and the Government there would be less information around for 16 days as to what happened in the previous quarter in wealth creation of the British economy.

B. The professional user

14. Michael Fallon MP is chairman of the sub-committee of the UK Treasury Select Committee which has a scrutiny function for the ONS. He said at a seminar in 2004 that as a businessman he was usually suspicious of 'revisions' because he felt lots of revisions seemed to mean that errors were being corrected. He identified three types of revisions in his view:

- Unplanned and regular – for example, regular revisions that fall outside the expected range (as with the GDP example above);
- Planned and unusual – such as the introduction of methodological changes;

- Unplanned and unusual – including errors. These inevitably get the media attention.

15. He added that the public conflated all types of statistics. There was no public distinction between National Statistics and other types of statistics and changes and revisions of any sort served to fuel further public suspicion.

16. The discussion at the seminar pointed to distrust of government influence on key statistics as the underlying reason for the sometimes aggressive and unreasonable press treatment of statistical revisions.

17. Simon Briscoe, the statistics editor of the Financial Times, is unusual in being both a journalist and a professional user. His view was that planned revisions were well understood, even if they were occasionally large. He was more interested in revisions from new methodology and the occasional ‘statistical howlers’ which were often caused by factors beyond the control of statisticians.

18. He said that statisticians should have a motto of clarity and communication. He called for better warnings and explanations of methodological changes and for statisticians to take journalists more into their confidence. Many journalists covered a wide range of issues and needed ‘spoon-feeding’ by statisticians when the issues are complicated.

III. THE REVISIONS POLICY

C. The protocol on Revisions

19. In the UK, the Office for National Statistics operates within a strict Code of Practice which includes a Protocol on Revisions. Here are the statements of principle concerning revisions:

- Substantial methodological changes will be announced before the release of statistics based on the new methods.

Additional principles embodied in the Protocol

- Each organisation responsible for producing National Statistics will publish and maintain a general statement describing its practice on revisions.
- Key outputs, or groups of key outputs, which are subject to scheduled revisions will have a published policy covering those revisions.
- A statement explaining the effect of revisions will accompany the release of all key outputs subject to scheduled revisions.
- Revisions will be released in compliance with the same principles as other new information.
- Timeliness of release will be balanced with the need to avoid frequent revisions.
- Producers of National Statistics will minimise the possibility of unexpected revisions but, if they occur, they will be released as soon as practicable and in an open and transparent manner.
- Substantial revisions will be accompanied by an explanation of their nature and extent.
- The long-term effects of revisions on key outputs will be monitored with a view to improving the quality of those outputs.

20. Revisions need to be as accurate, robust and freely available as new statistics, and they should be accompanied by the same supporting and explanatory information. For any set of statistics, the risks and causes of revisions should be clear. Users should know when they are due and be aware of them as they

arise. Users need to be confident that revisions applied across National Statistics meet known and agreed principles for handling revisions, and that these principles are applied in a consistent way.

21. Official statistics in the UK are decentralised; so each Government Department is required to publish its own statement describing its practice on revisions which in turn forms part of its Statement of Compliance to the Code of Practice.

22. Departments and divisions within ONS sometimes produce bespoke revisions policies based on the protocol. For example, the ONS Labour Market Statistics Division (LMD) says in its policy about communications: “It is vital that we communicate effectively with our users when dealing with revisions to our data. We must ensure that users are aware of the pattern of regular revisions, their usual time span and likely magnitude. Users should also be confident we will introduce unplanned revisions in a structured and transparent way.”

23. As part of its Revisions Policy LMD publishes a planned cycle of revisions which is available to all users of the data.

24. But as with anything set in stone there are sometimes difficult areas. For example, methodological changes can occur for reasons such as new techniques or in response to developments in the economy – particularly the need to measure new phenomena. ONS aims continually to review and improve procedures for making revisions. Some methodological revisions occur because statistics start to be used for purposes beyond their original design capacity. Equally new investment in statistical series can create revisions where there had been under-investment in the past.

25. ONS has recognised that the biggest challenge is how to improve communication about the likelihood of, and the reasons, for revisions. It is ONS experience that the non-expert view of statistics and revisions is largely determined by information which is filtered by experts, whether they are City analysts or the media’s economics correspondents. Therefore most of the gain is to be achieved through improved communication with analysts and specialist journalists.

26. In 2004, ONS made some innovations to improve communication. These included:

- Introducing information on average past revisions for key variables and details of planned future revisions to First Releases.
- Holding an economic statistics forum at which there were delegates from key users such as the City and the media. The Forum was used to explain how figures were put together and why revisions occur.

27. ONS is also continuously on the look out for estimates that might be unexpected by users which, of course, means having a good understanding of the external context and the use that is made of the figures. Good contacts are an essential part of this ‘horizon scanning’.

IV. WHAT MORE COULD BE DONE

28. Given that the measures described above have been in use by ONS since 2004, it is a shame that we should again have run into criticism for revisions in 2006. Maybe we’ve taken the eye off the ball because of many other things going on, such as re-location of the headquarters, reductions in staff, proposals for ‘independence’. However, this criticism might have happened anyway and we should acknowledge that changing public attitude is a long-haul rather than succumbing to a quick fix.

29. Certainly ONS acknowledges that one of the lessons learned from previous years is “the need to improve communication about revisions continuously.” Other lessons learned could be:

- The need to explain actively the challenges of the job, making judgements more available and not overselling the products.

- Much reporting of economic statistics is well-informed but there is a tendency to pick up peripheral issues in a way that distorts the public's perception of the value of statistics.
- Sometimes standard procedures in the Code of Practice might need to be augmented allowing the message to be repeated.

29. Michael Fallon in 2004 put out a call for UK statistics to be independent by statute and that National Statistics should be properly badged. He thought that breaches of the code should be investigated more thoroughly. He added that ONS should continue to educate the media and that more newspapers should have statistical editors (or experts) on their staff.

30. Certainly since then the UK Government has moved to make ONS 'independent', but how far this move will go to improving public confidence remains to be seen.

31. The seminar in 2004 also suggested looking at language. Instead of using 'revisions' as a cover-all, it would be less confusing to use terms like 'updates' when revisions arose from new information; 'improvements' when they resulted from methodological changes; and, 'corrections' for errors.

32. In addition to the more appropriate language more effort should be made to find out why errors occurred and implementing the lessons learnt.

33. Communication problems should be analysed and minimised and there should be more open communication with the media and ONS should be far less defensive.

34. The criticism of being 'too defensive' is one that resonates from the media. ONS can argue that demonstrably it is open and upfront about its revisions and when it makes a mistake it says so clearly and categorically. This, however, does not always stop the negative media coverage and the constant drip of poor publicity that damages public confidence.

35. It seems that the problem of communicating revisions to a sceptical audience will be an intractable problem until the more basic issues of 'statistical literacy' in the general public and better communication from statisticians have been tackled.