

# The Role of Official Statistics Agencies in the Promotion of Statistical Literacy Among Students

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## 1. Challenges of the new era

The world economy is moving towards becoming more and more knowledge-based. Statistics is playing an increasingly significant role in many of our endeavours. Be it the Government, investors, social organizations or members of the general public, they all make heavy use of statistical methodology and data in policy/strategy formulation, daily decision making and socio-economic studies these days.

Not having any statistical skills at all, a person stands to lose out whether in work or in daily living. However, statistics have to be applied properly. Otherwise, not only are the benefits not reaped, wrong conclusions could be drawn and wrong directions shown, hence harm is caused. It is therefore essential for every citizen to possess an adequate understanding of statistical concepts and methodologies and commonly available statistical data. Official statistics agencies are well placed to contribute to the promotion of the statistical knowledge of their communities. This is also a natural task for them too since it is in their own interest to ensure that the statistical data they produce are widely and properly used. If such is achieved, developments of the respective economies are assisted; whereas if statistics are often mis-used or mis-interpreted, the agencies would have to put in great efforts to make rectifications. Accordingly, many official statistics agencies undertake activities aiming to promote statistical literacy of people in various sectors in the community, including business people; students and teachers; and media workers.

## 2. Defining statistical literacy

It is commonly accepted that the goal of promoting statistical literacy is to orientate individuals in terms of : possessing basic understanding in statistical concepts and methods; being able to identify quality statistics from the pool of accessible statistical data; understanding statistical constructs such as indices and indicators; making proper use of relevant statistical data to understand facts and phenomena; and analyzing issues, making decisions and planning future actions with statistics. In essence, the promotion of statistical literacy deals with the issues of how to equip people to turn statistical data into information and knowledge and to apply statistics in their work or daily living.

## 3. Raising the level of statistical literacy of the community

As mentioned above, statistics is playing an ever more important role in day-to-day work in the government and the private sector, and is being used in public debate on community affairs. Yet, in many societies, the stage has not yet been reached that statistics is generally respected, trusted, understood and applied. There are people who still have little or no idea whatsoever of what statistics is, or who are suspicious of the truthfulness of released data as they have no skills to judge, or who view statistics as too complicated and absolutely impossible for them to handle. Raising statistical literacy of the community will address such problems.

Meanwhile, it is to be recognized that a higher level of statistical literacy does mean closer scrutiny of the methods used and the outputs produced by official statistics agencies. This is of course a proper development, despite initial worries of some agencies. There are, though, some true

worries since statistical literacy may not be increasing in a balanced fashion across the community, such that at some stage, there are people who think they have already got a good grasp of statistics while they are not, and begin to examine statistical outputs and methods critically.

In order to be effective, the characteristics and needs of different sectors in the community (e.g. students, teachers, media workers, business people) should be carefully considered so that the activities organized by an official statistics agency for the purpose of promoting statistical literacy are target-oriented and specific needs of different groups are suitably addressed.

In respect of various kinds of promotional activities, those targeting at students are among the most important. Being made statistically literate at an early age, people get into the habit of using statistics. Also, they will have a good foundation to build on for gaining further statistical skills and updating such skills as time passes by.

In so far as the promotion of statistical literacy of students is concerned, it is deemed necessary for an official statistics agency to establish relevant relationship with educational authorities and educational institutions thereby playing an effective advocacy role. Then, actions to be taken by the official statistical agency may include providing relevant education materials to supplement formal statistical education at schools; providing assistance to extra-curricular activities whereby students' understanding of statistical practices are enhanced; and facilitating easy access of official statistics to students in their study of other subjects and project work. By enabling and facilitating students to get in touch with official statistics conveniently, students will gradually get accustomed to making use of official statistics to deal with their daily endeavours, which will in turn help them build up a good foundation of proper use of statistical methods and data. As educational institutions, in particular secondary schools, are very effective channels for reaching students, an official statistics agency should place emphasis on working closely with them to do more on the promotion of statistical literacy.

#### **4. Promoting statistical literacy of students by an official statistics agency – the experience of Hong Kong, China**

In **Hong Kong, China**, the Census and Statistics Department (C&SD) is the central statistical office. C&SD takes an active interest in the promotion of statistics among students, and believes that this can be achieved through both advocacy and direct implementation of programmes and activities.

##### ***Facilitating the teaching of statistics at school***

Like many places, Statistics is not a stand-alone subject in the secondary school curriculum of Hong Kong, but subsumed in Mathematics. Contents include introduction to construction and interpretation of simple statistical diagrams and graphs, basic statistical measures and uses of Statistics. Though emphasis has been placed on foundational concepts, there is considerable room for expansion on the practical aspects of Statistics.

C&SD provides support to teachers to facilitate their teaching of statistics. Since 1990, C&SD has been compiling a teaching kit entitled "Living with Statistics". The kit, which is updated regularly every two to three years, is distributed to all secondary schools free of charge. It is aimed at providing teachers with materials and references for introducing students to statistical methods and commonly available statistics in Hong Kong. It contains materials of various kinds, including descriptions of statistical concepts and methods, commonly used official statistics, visual aids and suggestions for activities. It also draws attention to pitfalls to be avoided in using statistics.

The teaching kit contain two volumes, viz. the "Teaching Guide" and the "Activity Guide". Each chapter of the "Teaching Guide" contains a main part which describes concepts and methods and current social and economic situations of Hong Kong illustrated with examples and data. A glossary of useful terms and a list of references are also given at the end of each chapter. The contents of the "Activity Guide" are organized in correspondence with those in the "Teaching Guide". Each chapter contains suggested exercises/extra-curricular projects for students to work on.

Teachers of different subjects can draw upon materials provided in this kit very flexibly in designing their own teaching package. A section is also included whereby suggestion is made on

what statistical contents might be included in the teaching of different school subjects, such as Mathematics, Economics, Geography, Social Studies and Government Studies. The kit may, of course, also be used independently without relating to the syllabus of any particular school subject.

As teachers play an important part in the promotion of statistical literacy among secondary students, short courses aimed at providing basic statistical knowledge for secondary school teachers teaching relevant subjects are arranged by the department in collaboration with tertiary educational institutions and the Education and Manpower Bureau of the Government.

### ***Talks and visits for students***

C&SD organizes talks on statistics for secondary school students. These talks have been well received by both schools and students and the demand has been on the increase over the years. The effort is also supported by the educational authorities. Delivered by professional statisticians of the C&SD, the talks introduce commonly used statistical methods and data, covering areas such as population statistics, employment and unemployment statistics and Consumer Price Index.

Talks pitched at a more advanced level are organized for tertiary students, covering such topics as the sampling design of some of the surveys conducted by the department; methodologies adopted by the department in compiling seasonally-adjusted data series; methods of projections and forecasting; and use of sectoral economic statistics in business applications.

Visits to the C&SD are organized for students from time to time. A typical visit comprises a briefing session and a tour of the department. The briefing session covers general introduction on career opportunities in statistics; statistical work; structure of the C&SD and the various data dissemination channels of official statistics. The briefing session is followed by a tour of the department including the Computer Assisted Interviewing Centre, publication sales centre, the departmental library and other service centres of the department. Through these visits, students may acquire a better understanding of the work of the department and develop interest in statistical work.

### ***Educational materials and students' convenient access to C&SD's website***

Schools are encouraged to procure statistical publications, whereas University libraries are served complimentary copies of a considerable number of departmental publications. To promote and facilitate tertiary students in searching and reading statistical publications, C&SD has co-operated with the University libraries to prepare special guides, given that some of the publications could be catalogued under "Statistics" and others under "Economics", "Sociology", "Hong Kong Studies" and so on.

Since 1993, the C&SD has been publishing short statistical articles regularly in the "students" pages of selected local newspapers. The articles cover different aspects of statistics and describe in simple terms basic statistical concepts and data. The story-telling approach of the short statistical articles presents statistics in a lively way which makes them easy to understand.

Students are encouraged to access the website of the department to obtain up-to-date statistics covering major social and economic aspects of Hong Kong. They may also refer to the section on "Statistical Literacy", which presents the electronic versions of educational booklets/leaflets issued by the department. Statistical hyperlinks are provided between various educational websites and C&SD's website in order to motivate and facilitate students' access to statistics. Currently, plans are in hand to develop a dedicated "students' corner" in the website.

### ***Statistical Project Competition***

The Hong Kong Statistical Society has since 1986 been holding an annual Statistical Project Competition for Secondary School Students. As a professional society in Statistics, the Society has a mission of promoting the development of statistics in Hong Kong by providing a medium for advancing knowledge and enhancing appreciation of the theory and application of statistics. The declared purpose of the Competition is to encourage students to gain a good understanding of the community they live in through the use of statistics. From the very early start, C&SD has been providing much support to the Competition. The Commissioner for Census and Statistics has always acted as one of its Patrons and many professional staff, being concurrently members of the Hong Kong Statistical Society, assist in organization and adjudication.

Entrants of the Competition are required to conduct a project on a topic that is related to the social or economic situation of Hong Kong. Simple statistical analysis and reasoning is to be carried out based on available official statistics. It is pleasing to see that the Competition has been widely supported by schools and students through the years. Significant improvements have also been noted in the quality of the reports submitted by the students over time. In fact, many members of the younger generation have revealed that through participating in the Competition, they have learnt how to understand the community in an objective manner through proper use of scientific methods and statistical data and have developed a sense of civic awareness.

## 5. Concluding remarks

Statistical education enables students to develop the habit and the skills to understand society and discuss social issues in a scientific and objective manner. From this perspective, statistical education is in effect an important component of civic education, which is in turn a key to democracy and the success of a community. The devotion of attention and resources by official statistics agencies to this area is therefore appropriate and consistent with their position as a government authority.

Spending resources to organize activities to promote statistical literacy of students is also worthwhile as this will contribute to the operation of an official statistics agency. This is because students will have dual roles when they become grown-ups as both raw data suppliers and statistical data users. As raw data supplier, a statistical literate citizen is more likely to be cooperative in surveys. In turn, the response rates of surveys and quality of results can be improved. As statistical data user, a person who has developed an interest in the subject during his school days would value good statistics and will hence be better customers of official statistics.

It is important, though, that the programmes organized should be innovative, interesting and motivating. Statistics, after all, is not a subject that triggers interest at first sight. However, if done well, the promotional efforts could get the target audience really interested.

## REFERENCES

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## RÉSUMÉ

*Les progrès de l'économie mondiale s'appuient de plus en plus sur le développement des savoirs ; il est donc essentiel que chaque citoyen soit en mesure de comprendre de façon correcte et adéquate les concepts statistiques et les données statistiques couramment disponibles. Les bureaux officiels de la statistique publique jouent un rôle de premier plan pour la promotion des connaissances en statistique auprès des différentes communautés auxquelles ils s'adressent. Tout en reconnaissant qu'il y a de multiples façons d'organiser ces activités de promotion, celles visant le public des étudiants comptent parmi les plus importantes. Dans cette optique, le Département des Recensements et des Statistiques de Hong Kong, Chine, mène une action vigoureuse pour la diffusion des savoirs en statistique et organise à cette fin une large palette d'activités pertinentes.*