



REPORT ON EDUCATION COMMITTEE ACTIVITIES

The IBS Education Committee consists of ten members including the chairman. The committee has been working on five identified domains with two members assigned to each of the domains. This report aims to inform the IBS members on developments that have been made on each of the domains. The following are the domains:

- 1) *Short Courses and Summer Schools*
- 2) *Full Graduate Programs*
- 3) *Collaboration with National and International Societies and Organizations*
- 4) *Biostatistical and Biometric Education for our Scientific Partners*
- 5) *Web-based and Distance Learning*

A brief summary of each of the above domains is presented below.

Domain 1: Short Courses and Summer Schools (*Peter Njuho and Jhonny Demey*)

Several bodies have devoted time and energy to summer/winter schools in biostatistics, epidemiology, and related fields. Most of these are institutional based and the cost to attend differs. Some are regularly organized whereas others are one off depending on the demand. For example, a 2-week Summer School takes place in Italy (Trieste, UNESCO sponsored), based on a joint initiative from Karolinska Institutet (Sweden) and the Harvard School of Public Health. The IBS education committee is charged with seeking involvement in and fostering of such activities. A wide variety of initiatives have been in existence in different countries and information posted on institutional websites.

Over the last decade, the IBS has developed a successful record of organizing short courses surrounding IBC's. These courses serve a double purpose: (1) to provide education to the membership in important (emerging) topics and (2) to generate revenue for the Society. The Society is in good company since other Societies too have such educational programs, with both of these goals in mind (e.g., RSS, ASA, ENAR). Nevertheless, there are important differences. Whereas RSS, ASA, and ENAR operate within a relatively homogeneous national context, IBC's are truly international encounters, with members from diverse national, educational, economic, linguistic, and cultural backgrounds. This poses specific challenges to the successful educational program. Topics of common knowledge in one part of the world may be new or unknown in another. The body designing the educational program

for an IBC is often aware of this. This is best achieved through the diverse composition of such a committee. Given different economic backgrounds, a differential fee structure is in place.

The fact that English is the most common language for scientific exchange (international meetings, scientific journals) poses, again, specific challenges to members from various linguistic backgrounds. While this is less of a problem for small linguistic communities, it is more so for the larger ones, such as the French speaking and Spanish speaking communities. The Society has a mission in recognizing the importance of these languages, arguably for transnational exchange (e.g., within Latin America), but not for international exchange. A way to reach out to those who struggle with scientific English is the organization of tutorials and short courses in various languages (e.g., a short course on longitudinal data, Spanish and/or French spoken but with English or even bilingual transparencies). Such an approach will enhance communication between biostatisticians worldwide and hence increase the overall level and quality. The language problem is partly addressed through incorporation of short courses during the regional meetings.

The pre-conference courses preceding the sub-Saharan African Network (SUSAN) have proved to be very effective and popular. The consistent support obtained from the Center for Technical and Rural Agriculture (CTA) in facilitating the courses, by sponsoring at least three participants from sub-Saharan African countries to attend, have enriched application of biometry in Africa. In addition, the IBS has been contributing through support of resource persons and ensuring either the IBS Vice-President or the President attends both the courses and SUSAN main conference.

We plan to discuss with the IBS webmaster how to create a site for posting announcements for short courses, resource persons, targeted audience and contacts for possible sponsors.

Domain 2: Full Graduate Programs *(Tomasz Burzykowski and Vincent Oeba)*

In July 2008, a report was submitted to the meeting of the Committee, held during the IBC in Dublin. It was based on a review of the existing biometry/biostatistics programs. The review allowed drawing several conclusions, which could be useful in developing the strategy for support of the graduate programs by the IBS.

To complement the previous reports, additional information about practical implementations of graduate programs in (bio)statistics/biometry has been gathered. In particular, the following persons have been contacted:

- Prof. Luc Duchateau, from the University of Ghent, who coordinates an Institutional University Cooperation (IUC) programme with the Jimma University (JU, Ethiopia), sponsored by the Flemish Interuniversity Council – University Development Cooperation (VLIR-UOS). The objective of such an IUC is institutional capacity

building, enabling the university to better fulfill its role in society in terms of education and applied research. One of the goals of the project at the JU is to build a graduate program in biostatistics.

- Prof. Marc Aerts, from Hasselt University, who coordinates the work-package *Biostatistics & Modeling* in the University Development Cooperation project with the Universidade Eduardo Mondlane (UEM, Mozambique). The main goal of the work-package is the development of the education and research in biostatistics at the UEM. I have also used an opportunity to give a short course at the UEM to acquaint myself with the issues and problems related to a cooperation aimed at organizing/extending education capabilities.
- Prof. Geert Molenberghs, from Hasselt University, who coordinates an IUC programme “A Cuban-Flemish Training and Research Program in Biomedical Statistics and Bio-informatics” at the University of Havana.

Based on the 2008 report and the additional information, the following conclusions, relevant to the possible support of organization of long-term graduate programs by the IBS, can be formulated:

1. The three key aspects for a program are: the infrastructure, teaching materials, and the staff. The infrastructure needs to exist and should be provided by the local institution, which wants to implement the program. There should also be some local staff, which could take over the coordination and teaching of all the courses in a long-run. The goal of the IBS support should be to help with the development of the teaching materials and with the training of the local staff.
2. The development of the teaching materials and the form of the training may depend on the competences of the available staff. For instance, in some cases, courses taught by guest lecturers (sponsored by the IBS), which would be attended by the local staff and used as templates for the development of the future course notes, could be sufficient. One practical drawback of this solution is that the local staff members may find it difficult to find time to attend the course and work on the notes, while staying at their home institution (due to other duties). A somewhat more focused, alternative solution is to invite the members to attend courses in an existing master program abroad. The stay (extended, if needed) can also be used by the staff members to develop, under an appropriate supervision, course notes. The notes would serve for teaching a course in the next academic year in the IBS-supported graduate program.
3. An important issue is to maintain the competences of the local staff and their interest in supporting the graduate program. To this aim, the IBS could consider funding short (up to, e.g., three months) research/competence development stays, during which the staff members, who show substantial support to the coordination and teaching of the program, could improve their skills by attending courses, conducting research etc., at well-recognized research institutes or universities.

4. The teaching materials, developed with the help of the IBS for the purposes of inclusion in a graduate program, could be made available at a dedicated website. They could be used as templates for other programs, organized with the support of the IBC.

Domain 3: Collaboration with National and International Societies and Organizations (*Hongzhe Li and Hirohisa Kishino*)

Working with the other EC members, Domain 3 conducted a web-based questionnaire to obtain the potential needs from the societies in November, 2008. We asked representative people of the international societies in medical sciences, ecology, zoology, genetics and systematic and others (the questions and the list of the target people are in the Appendix: IBS-ECsurvey08covletter.pdf, IBS_enquete.html, IBS_Q_target08Nov.pdf). While the questions themselves are easy to be answered, IBS did not receive responses. It may not be unexpected that the societies do not have words to answer as the voice of the institutions. There are many successful collaborations of individual levels in many fields in general biology, medical sciences and ecology. However, the collaboration between institutions was not captured. Through the email communication between Hongzhe and Hiro, Hongzhe gave very crucial and concrete suggestions as follows. Hiro thinks that he is an ideal biostatistician who plays an important role in the related societies, and recommends IBS and IBS-EC to discuss such possibilities in more detail in the coming year with him. The message from Hongzhe Li follows:

Due to the interdisciplinary nature of biostatistics and biometric research, it is crucial for IBS to get involved with other national and international societies and organizations through joint sponsorships of conferences and short courses. For example, many of the biostatistics researchers working in the area of statistical genetics and genomics attend the annual conferences in human genetics, genetic epidemiology, and bioinformatics, sponsored by the American Society of Human Genetics, International Society of Genetic Epidemiology and International Society of Computational Biology. We should improve the visibility of IBS in these conferences. In fact, many of the biostatisticians have already held important positions in these societies and organizations. We can first get in contact with these biostatisticians to discuss our willingness and possibilities of establishing closer collaborations with these societies.

Another possible involvement of IBS is to establish collaborations with statistical/biostatistical organizations in mainland China. Biostatistics/Biometrics was almost non-existent in China several years ago. However, recently, we have witnessed many establishments of biostatistics analysis centers in China from many of the world's largest pharmaceutical companies. In addition, we have also seen more and more demands of clinical trial expertise in China as the pharmaceutical companies are in better shape now. Besides clinical trials and genomics research, biostatistical expertise in environment health and HIV research are also in great need. However, Biostatistics in China is still in its infancy. IBS, as

an international organization, can play an important role to help shape the biostatistics research in China. For example, we can consider holding IBS conferences in Asian countries, particularly in China, to promote the importance of rigorous biostatistics research.

Domain 4: Biostatistical and Biometric Education for our Scientific partners (*Larry Freedman and Krista Fischer*)

This domain covers a wide array of (i) levels and scopes of biometry education, (ii) target audiences, (iii) approaches and (iv) deliverers. We have provided in a separate document a brief survey of the field and have aimed at providing the Committee with a starting point for their activities in this Domain. We have specified 16 examples of programs for the statistical education of professionals and scientists in the health/biological sciences. We did not find any programs aimed specifically at agriculturists, although this does not mean that such programs do not exist.

- A. Perhaps the most common type of statistical education for medical/biological scientists are the courses given as part of their undergraduate and graduate degrees. Such courses form part of the formal education given to our scientific partners. Judging from our experience with the average understanding of statistical concepts attained by medical and biological scientists, there is little doubt that these courses could either be improved or need reinforcement at a later period in the scientist's career. My impression is that the topic only comes to life when the scientist needs to use statistics in real-life situations and that is the optimal time to deliver the education.
- B. For this reason, new flexible approaches to further education are required. In fact there is ample evidence that such opportunities are becoming increasingly available. On-line courses in statistics and biostatistics are now being supplied by a variety of organizations.
 - (a) Several universities are providing open access to courses in biostatistics and statistical reasoning. It appears that one could take such courses entirely free, although I suspect that in such cases no formal certificates are provided. The course materials should be extremely helpful to teachers in creating their own course materials. Examples are courses prepared by John Hopkins School of Public Health and Tufts University. The level of statistics taught covers a broad range.
 - (b) Other universities are offering courses that are delivered on-line for a certain fee. For example Trinity College, Dublin offers an on-line course on essential statistics for medical and health professionals.
 - (c) Professional bodies are also beginning to provide on-line statistical training as part of the further education that they feel is needed by their members. An example is an initiative created by the American College of Clinical Pharmacology.
 - (d) Commercial firms have also seen the need and demand for such further training. For example, s courses in a wide range of statistical topics, and a new course is being

developed specifically for molecular biologists by a company called Gene-Ed. Another company, BioPortfolio, provides a biostatistics course to a more general medical audience. The latter two courses are CME-accredited, that is, they contribute towards the formal continuing medical education that is required by many institutions in the Western world.

- (e) A service providing on-line CME-accredited lectures free of charge is MedsiteCME. The faculty includes one biostatistician – there is room for expanding the biostatistics content.
- C. Occasionally, special workshops are provided for statistical education of a specific group of professionals. An example is the workshop for molecular biologists provided by the TATAA Biocenter in Germany.
- D. Another mode of delivery is through summer programs held by universities and research centers. These are increasingly being linked to CME-accreditation, as in McGill University and University of Michigan.
- E. Finally, to return almost complete circle, some universities are offering short courses delivered in the lecture room in Biostatistics that give CME accreditation. Examples are University of Virginia and Harvard.

In summary, it is apparent that new more flexible methods for delivering statistical education to our scientific partners are developing. It is suggested that the IBS explore the possibilities of partnership with other professional/academic bodies to enhance and disseminate these new approaches.

Domain 5: Web-based and Distance Learning (Andreas Ziegler and Scarlet Bellamy)

Rationale: Education is an integral component of increasing our profession's profile. While master and PhD level education in the interdisciplinary subjects biometry, biostatistics, epidemiology and genetic epidemiology is provided at high levels in several regions, there are parts of the world where biostatisticians and epidemiologists have to fight hard to have their discipline recognized as one deserving proper specialized education (Molenberghs G, Davidian M. Strategic plan document, version 8. 2003; www.tibs.org/WorkArea/downloadasset.aspx?id=718; accessed on: July 11, 2009). Further enhancement of the biometric, biostatistical, epidemiological and genetic epidemiological professions will be most efficient if both the profession itself as well as its many scientific partners receive appropriate initial, graduate and continuing training. A part of this training can take place in satellite meetings and educational sessions at conferences, short courses or summer schools. These activities are, however, expensive because they require traveling of teachers and/or students, and they are fixated on a specific time point or period. The traveling costs can be avoided and the capacity of teachers can be multiplied by making appropriate use of e-learning tools.

Findings: We explored the availability of e-learning approaches in the areas of statistics, biometry, biostatistics, epidemiology, and genetic epidemiology by a systematic literature search and a search in databases. We identified a total of 25 courses. They differ with respect to target audience, content, amount and quality. Many of them had been developed at a time when technical aspects were the main hurdle at the stage of course development. Important hygiene and motivation factors were generally unknown at that time, and, subsequently, ignored. As a result, none of the courses provides exercises that generate individual feedback to motivate the student, and no varying degree of complexity is observed. Many courses do not fulfill modern needs for e-learning. In conclusion, the development of modern e-learning following recent didactical concepts is urgently required. Sustainability of these courses is crucial and can be best guaranteed by using available technological platforms. These allow the use of common didactical principles, robust and reliable technology.

Proposed implementation strategies: None.

Recommendation: Convince funding agencies to finance the development of appropriate distance learning courses.

Views on the issues raised in this report can be directed to the Chairman of the IBS Education Committee.

Compiled by:

Peter Njuho, PhD

IBS Education Committee Chairman

([E-mail-PNjuho@hsrc.ac.za](mailto:PNjuho@hsrc.ac.za))

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