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IMPORTANT CONSIDERATIONS FOR OPTIMAL COMMUNICATION BETWEEN STATISTICIANS AND MEDICAL RESEARCHERS IN CONSULTING, TEACHING AND COLLABORATIVE RESEARCH, WITH A FOCUS ON THE ANALYSIS OF ORDERED CATEGORICAL DATA

This paper focuses on problems encountered in the teaching of statistics to applied researchers working particularly with rating scales and questionnaires. Examples of teaching strategies that are designed to remove misconceptions and the misuse of statistics will be presented. Such strategies should increase the level of understanding about the relationship between study design, measurement processes and the choice of statistical methods of analysis. A survey among applied researchers showed that tradition, the need to compare the results with other studies and a lack of knowledge of novel statistical methods were the major factors determining the choice of methods for evaluation of questionnaires. Besides pedagogic skills, professional competence and an open-minded inter-disciplinary understanding were the most important qualifications for optimal inter-professional communication.

1. BACKGROUND

Various reviews of medical journals have highlighted the poor quality of methodology and statistics in medical research (Altman, 1991; 1994; Hand, 1994; Coste, Fermanian, & Venot, 1995; Feinstein, 1997). The increasing use of complex methods, such as survival analysis and multiple regression analysis, and the use of questionnaires and rating scales, also creates problems. Therefore, there is a clear need for statisticians to be involved in applied research at an early stage (Altman, 1998; Nelder, 1999).

However, the accessibility of statistical computer programs may provide an excuse for not consulting a statistician, to the subsequent detriment of the scientific quality of the research. A reliance on statistical software without enough statistical knowledge could result in incorrect statistical treatment of data (Shimada, 2001; Jolliffe, 2001).

Recently, Hand (1996) drew attention to the fact that little consideration is given to the relationship between measurement theory and assessment, although this is fundamental to the choice of statistical approach to the data. The published comments to his paper, given by several statisticians, illustrate the various opinions that are prevalent concerning the importance of theories of measurements. Clearly, the impact of the measurement process on the correct choice of statistical analysis must be considered for each study (McPherson, 1989; Altman, 1991; Svensson, 1998a).

Questionnaires and rating scales are commonly used to measure qualitative variables, such as feelings, attitudes, preferences and health-related variables. The response values from rating scales indicate only an ordered structure and not a numerical value in a mathematical sense (Stevens, 1946; Merbitz, Morris, & Grip, 1989;

Agresti, 1990; Hand, 1996). The rank-invariant properties of data from rating scales mean that the statistical methods used for their analysis differ completely from the traditional statistical methods for quantitative variables (Svensson, 1993). The rank-invariant properties of ordered categorical data are well known, even if there is still controversy about the measurement properties of data from rating scales and a misuse of statistical methods and misinterpretation of results from qualitative measurements. As categorical responses are often transformed into numerical scores, there is also a temptation to treat such quantified data as numbers with the same arithmetic properties as quantitative data (Feinstein, Josephy, & Wells, 1986; Agresti, 1990; Altman, 1991; Coste, Fermanian, & Venot, 1995).

2. INTRODUCING NOVEL STATISTICAL METHODS FOR ORDINAL DATA

With the popularity of questionnaires, there is an increased demand for statistical methods for dependent ordinal data. My research concerns development of statistical methods that take account of the rank-invariant properties of ordinal data. A family of methods for a comprehensive evaluation of reliability and also of change in ordinal assessments has been proposed (Svensson, 1993; 1997; 1998a; 1998b). The basis of this novel statistical approach is the bivariate ranking procedure that makes it possible to measure the systematic component of change in paired assessments separately from the individual variations.

The demand for rank-invariant statistical methods for dependent ordinal data among applied scientists has led to the early introduction of these methods in courses and collaborative research projects, and also to reformulation of the mathematical description of the measures (Sonn & Svensson, 1997; Gosman-Hedström & Svensson, in press; Claesson & Svensson, 2001). Therefore much experience concerning the consequences of introduction of novel statistical methods on applied research is gained.

3. FOCUS OF THE PAPER

This paper will focus on the teaching and learning processes associated with the statistical treatment of data from questionnaires and rating scales. The link between the teaching and learning processes is the inter-professional communication based on a mutual understanding of the problems from both the applied science and statistical perspective (McPherson, 1989; Altman, 1991; Greenfield, 1993).

My own experience of the importance of creating good inter-disciplinary communication and of the similarities and differences in the teaching processes between education, consultation and research collaboration will be reported.

Furthermore, the factors identified by applied researchers in their choice of methods for statistical analysis of data from rating scales will be reported from a questionnaire, which attempted to define the researcher´s attitudes towards rank-invariant statistical methods and the reasons behind the choice of appropriate or inappropriate methods of analysis. The results will form the basis of recommendations for approaches to achieve optimal inter-disciplinary communication in teaching, consultation and collaborative research with regard to statistical methods for ordered categorical data.

4. TEACHING STATISTICS TO RESEARCHERS

Fundamental to the teaching of practical statistics is the mutual recognition of the complexity of the applied research problem in relation to the statistical possibilities and restrictions. Therefore, the main criterion for a successful learning process is to create optimal communication between the statistician and the applied researcher. The researcher should gain scientific and statistical knowledge and confidence in order to be able to choose appropriate statistical methods for the research project. Therefore, it is important to find a common language and to make the statistical theories and approaches understandable and relevant to the researcher's own field of interest.

This is the basic approach to the teaching model used by the author for research courses in practical statistics for applied scientists in Sweden. The teaching model is interactive and focuses on statistical strategy rather than on statistical technique (Svensson, 1998c). The measurement process, including the operationalisation process of the variables, and the identification of the measurement properties of the data, are important issues. The participants are encouraged to apply appropriate methodological and statistical theories to their own research problems and to discuss the research process during the course. A model for teaching the measurement process was presented at the ICOTS 5 meeting in 1998 (Svensson, 1998d).

Another important issue to take into account in the teaching process is the potential conflict between members within a research group when introducing new statistical approaches. In order to avoid communication problems and scientific conflicts, courses in scientific methodology and applied biostatistics have been given to research groups that have included all the researchers, their supervisor and others sharing the same research problem. The experiences gained from such courses have also been presented at the ICOTS 5 meeting in 1998 (Svensson 1998c).

The consultation procedure provides an ideal learning situation, as the statistician and the researchers can concentrate their discussions on a specific applied problem. The main teaching approach in research courses on applied statistics is to create a climate of mutual understanding, which is very similar to the consultation situation.

In a course, there is often a broad range of fields of interests represented. By means of interactive learning, the researchers must apply the methodological and statistical theories to their own research problems. In the discussions with other participants, similarities and differences in statistical solutions, in the measurement processes and comparisons between approaches for qualitative and quantitative data will increase their understanding of problems and also shed light on the need for different statistical methods for different types of data. This means that it is sometimes advantageous to discuss statistical approaches in a course, as all the researchers contribute to the understanding of the statistical solutions to the complex problems encountered in reality.

5. THE SURVEY

Between 1994 and 1999, courses in scientific methodology and practical statistics for applied researchers in medical and health sciences were offered to doctoral students and others involved in research projects at Göteborg University and the Sahlgrenska University Hospital, Sweden. As mentioned above, some of the courses were aimed at clinical research groups including the supervisors and post-doctorate scientists. In 1999,

a questionnaire was mailed to all 108 individuals, with known addresses, who had participated in the courses, in seminars or consultations with the author. This means that the participants of this survey have a good basic knowledge of statistical methods, and they were all aware of the link between the measurement properties of data and the choice of appropriate statistical methods of analysis.

6. RESULTS

Responses to the questionnaire were obtained from 73 individuals (68% of the questionnaires sent), who were involved in ongoing research projects as researchers or supervisors. Sixty had participated in a research course, and the others had participated in shorter courses, seminars and/or statistical collaboration with the author. The largest professional group were physicians (n=25), but nurses, occupational therapists, physiotherapists, social workers and laboratory technicians were also represented.

As part of the survey concerned various aspects of being dependent on a supervisor, three subgroups were identified. There were 42 doctoral students, who had supervisors ("doctoral student"). Twenty individuals were involved in research projects as researchers, assistant researchers or as student supervisors to master's degree at university ("others"). Finally, eleven post-doctorate researchers were included, of whom six were also supervisors ("post-doc").

6.1. ROLE OF THE STATISTICIAN IN APPLIED RESEARCH

Table 1 shows which parts of the research process commonly involved a statistician at the research department according to the 54 individuals, who responded to the question. One main reason for the 19 non-responders was that they did not know the common routines at the research department. According to nine of the 54 responders (17%) a statistician was never involved in the projects at the research department. In general, according to 30 (56%) responders, a statistician will be involved after all data have been collected, and this was often the first reason for involving a statistician.

Three of the supervisors were aware of that contacting a statistician first when all data were collected was too late. One of them proposed a biostatistical centre at the hospital with access to free statistical advice before starting a study.

Table 1. Frequency (and Percent) of Responses about which Research Process Stage Involved a Statistician

Research process stage (n=54 responses)	Stage involving a statistician	First stage of statistical contact
Planning	18 (33)	18 (33)
Design of materials, sample size	16 (30)	5 (9)
Design of methods	12 (22)	2
After collecting data	30 (56)	18 (33)
Interpretation of calculations by computers	10 (18)	1 (2)
When writing the report/article	14 (26)	1 (2)
After the referee´s review	7 (13)	
None	9 (17)	9 (17)

A similar question concerning the involvement of a statistician in ongoing research among the 42 doctoral students showed that 29 (69%) had involved a statistician. The

first reason for contacting a statistician was design issues (41%) or statistical treatment of data (38%). Some of the doctoral students pointed out that since they attended the statistical research course at the beginning of their research project they had to apply the measurement process and other design issues to their own research. Three of the non-responders were not aware of the importance of a statistical contact, and the supervisors of four doctoral students judged that there was no need to involve a statistician.

Four of the post-doctorate researchers stated that supervisors are supposed to have sufficient knowledge of statistics. Therefore, contacting a statistician was a low priority. However, some of the doctoral students were recommended to contact a statistician even when the supervisor had had a negative experience of consulting a statistician because they failed to focus on the research problem. Another comment was that there was a lack of statisticians who were well acquainted with nursing research. Therefore, well-known statistical methods, even though inappropriate for the research problem, were chosen, despite the fact that this would lead to unreliable conclusions. One supervisor commented that it was easier to keep to tradition than to hear from the statistician that the approach used was inappropriate.

6.2. THE MEASUREMENT PROCESS AND THE CHOICE OF STATISTICAL METHODS

According to 20 of the 42 doctoral students, there was generally no discussion between the supervisor and the doctoral student concerning the link between the properties of data, the design and the choice of statistical methods. The main reason mentioned (n=14) was the lack of knowledge among the supervisors, and that this kind of question had a low priority (n=7) in discussions concerning the research project. Four doctoral students mentioned that there was a statistician involved in the project, but a statistician was generally not involved in the discussions. According to seven post-doctorate researchers, there was an intention to discuss design problems with a statistician, but this had a low priority and was not normally included in the research process.

Table 2 shows that tradition and the statistician´s advice were the two most common external reasons for the choice of statistical methods. The purpose of the study and the properties of data also determined the choice of statistical methods according to five doctoral students and three post-doctorate researchers.

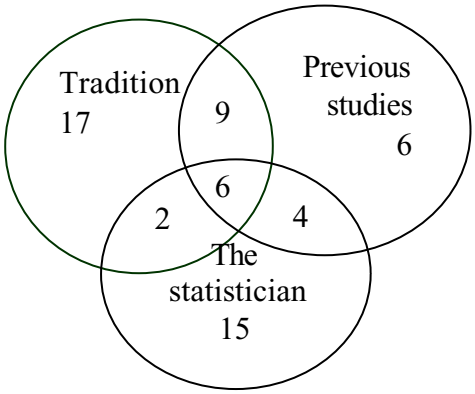
Table 2. Frequency (and Percent) of Usual Considerations Behind the Choice of Statistical Methods in the Different Groups of Individuals Involved in Scientific Projects

Considerations for the choice of statistical method	Doctoral students (n = 42)	Post-doc (n =11)	Others (n =20)	Total (n=73)
Tradition	22	5	9	36 (49)
Statistician´s advice	20	4	4	28(38)
Previous studies	13	3	8	24(33)
The journal	6	0	3	9(12)
The statistical software	2	1	4	7(10)
No response/ do not know	2	1	4	7 (10)

Figure1 shows the relationship between the three main considerations behind the choice of statistical methods according to 59 individuals. In seven additional cases the

purpose of the study or the properties of data were mentioned as single reasons for the choice of statistical methods.

Figure1. Relationship Between the Three Main Reasons Behind the Choice of Statistical Methods in 59 Responses



Sixty-two responders rated the level of importance of keeping to the tradition in the choice of statistical methods. One third stated that it was "very important"(8) or "important" (12), while the traditional choice of statistical methods was "not so important" (23) or "unimportant" (19) according to 68% of the responders. The most frequent reasons for opinion among the doctoral students (n=41, one non-responder) are listed in Table 3. The numbers of similar responses are given in parentheses.

Table 3: Relative Importance among 41 Doctoral Students to Keep to the Traditional Choice of Statistical Methods and (Frequency) of their Reasons

Reasons for considering Very important (n=4) or Important (n=8) to keep to tradition	Reasons for considering Not so important (n=16) or Unimportant (n=13) to keep to tradition
Communication with the supervisor and the research group (3)	It is more important to choose appropriate methods (7)
Comparability with previous studies (3)	The research field is new with no traditions (4)
The traditions maintain the quality of research (2)	Traditional methods are not appropriately updated (3)
The supervisor is stuck to the tradition and scientific journals (1)	Confidence gained in statistical advice (1)
Acceptance (1)	A possibility to influence the tradition (1)

6.3. THE CHOICE OF NOVEL STATISTICAL METHODS

The statistical treatment of data from rating scales and questionnaires should take into account the non-metric properties of ordinal data. The research groups of three doctoral students used statistical methods appropriate for ordinal data. Sixteen of the 30 doctoral students, who dealt with rating scales, and eleven of the others involved in projects knew that some of the research group members used statistical methods that assume quantitative data, when qualitative data were analysed. The main reasons mentioned for this were that it allowed comparison with other studies and a lack of knowledge among supervisors and other applied scientists (Table 4).

Table 4. Frequency of Researchers' Main Reasons to Use Statistical Methods Suitable for Quantitative Data in the Evaluation of Qualitative Sata

Main reasons	Doctoral students (n=20)	Others (n=11)
Comparability with other studies	12	6
Lack of knowledge by the supervisor	10	8
Better acceptance with traditional methods	8	3
Treatment according to the manual of the instrument	5	3
Lack of knowledge among researchers	4	5
The fear of going against the current	4	3
Disagreement between statisticians	4	4
The same results with different methods	5	1
The journal wants well-known statistical methods	4	1

6.4. STATISTICAL ANALYSIS OF DATA FROM RATING SCALES

The majority, 50 out of 73, of the individuals in the present study used rating scales in their research. For 19 of them the rating scales were the main instruments in the research.

Among eight of the doctoral students and five of the other researchers, there had been conflicts with their supervisors concerning the choice of statistical methods for analysis of data from rating scales and questionnaires. The reasons were the choice of the novel rank-invariant statistical method instead of the traditional treatment (n=8), the choice of scaling (n=3) and the statistical description of ordinal data. Five of the doctoral students had to use parametric methods in their latest research in order to be able to compare results with previous studies and also because this was demanded by the supervisor.

Table 5. Reasons Given by Doctoral Students for not Using Novel Statistical Methods for Ordinal Data (and their Frequency)

The lack of knowledge concerning new statistical methods (n=13)
Among supervisors
Among research group members
Among statisticians
Alternative statistical methods are unknown
Publication delay when using novel methods
Lack of communication between statisticians and applied scientists
Lack of biostatisticians
The tradition in the research group (n=9)
Disagreement amongst statisticians
The presence of various approaches to analysing data from rating scales
The need to compare with other/previous studies (n=8)
A matter of acceptance
The refereeing system
Difficulty of changing established behaviour
Difficulties in learning new techniques
Resistance in research group
Lack of confidence
New statistical methods are not accepted

The major reasons why novel statistical methods for ordinal data were not used, according to the doctoral students, were lack of knowledge, the tradition within research groups and that traditional methods were demanded in order to compare results with those of previous studies (Table 5). Seven doctoral students have applied the rank-invariant approach in their research. One scientific journal required the traditional parametric approach, before it would accept the paper.

Table 6 presents the pros and cons of choosing a novel statistical method of analysis according to the experiences of these doctoral students. The numbers of similar responses in parentheses.

Table 6. Advantages and Disadvantages of Choosing a Novel Statistical Method Experienced by Seven Doctoral Students (and their Frequencies)

Advantages	Disadvantages
It was the appropriate method for the research problem (n=6)	Conflict with the other researchers (n=2)
The results are reliable and interpretable (n=5)	Lack of confidence in novel methods among reviewers (n=2)
The possibility of performing a comprehensive evaluation of data (n=4)	Difficult to compare results from other studies (n=1)
Ethical reasons (n=1)	Time to learn new methods (n=1)
Scientific challenge (n=1)	
Scientific relevance, quality (n=1)	
Honest reporting of the results from subjective assessments on rating scales (n=1)	

6.5. FACTORS OF IMPORTANCE FOR THE OPTIMAL COMMUNICATION BETWEEN STATISTICIANS AND APPLIED RESEARCHERS

The main open question of this study concerned important qualifications among statisticians and the applied scientists, and other considerations, for obtaining meaningful communication. Table 7 shows the suggestions from 65 of the 73 individuals. The numbers of similar responses in parentheses

Additional considerations of inter-disciplinary importance, mentioned by 34 individuals, when the research involves rating scales and questionnaires, were:

- Collaborative research projects with a competent biostatistician;
- Open-minded discussions;
- To offer seminars, workshops and courses for applied scientists including supervisors;
- To offer seminars, workshops and courses for biostatistician;
- To have an open dialogue with the supervisor;
- Ability of breaking the resistance against novel statistical methods in research groups;
- To show inter-disciplinary respect, humility, understanding;
- Inter-disciplinary communication in all research projects;
- To make statistical methods understandable for applied scientists.

Table 7. The Most Important Qualifications and Considerations for Effective Inter-Disciplinary Communication Suggested by 65 Responders

Qualifications of the statistician	Qualifications of the applied researchers
Competence (n=24):	Statistical knowledge/understanding (n=25)
Broad knowledge of applied statistics	Knowledge in basic practical statistics (n=25)
Experienced in applied statistical research (n=4)	Interest in learning (n=12)
	Open-minded to statisticians and statistical advice (n=19)
Interdisciplinary knowledge/interest (n=19)	
Knowledge of the applied research field (n=19)	Scientific competence (n=32)
Understanding of the applied research problem/context (n=17)	Ability to present the research problem and clearly defined questions (n=32)
Awareness of clinical/practical difficulties in applied research (n=8)	To have a scientific approach to the research project (n=8)
Interest in applied research problems (n=15)	A true interest in the applied research problem (n=5)
Ability to enter into the applied research problem (n=7)	Ability to define the measurement process (n=3)
Open-mindedness, flexibility (n=10)	To be honest (n=2)
Pedagogic ability to: (n=21)	
Explain understandably (n=12)	Inter-disciplinary communication (n=20)
Listen (n=7)	To make early contact (n=13)
Motivate into accepting the relevance of suggested methods(n=5)	To be well-prepared (n=9)
Collaborate (n=4)	Open minded, flexible, curious, unafraid of questioning (n=18)
Be distinct, honest, confident (n=10)	Ability to explain the use of traditional methods (n=1)
Accessibility, continuity (n=14)	Ability to break the use of traditional methods (n=3)
Other(n=6)	Ability to collaborate (n=3)
Persuasive powers, a sense of humour, Enthusiasm, ability to enjoy his/her work, patience	Accessibility

7. DISCUSSION

This study among researchers with good basic knowledge of statistical methods showed that about half the doctoral students discussed the relationship between the properties of data and the choice of statistical methods with their supervisors, but commonly without a statistician present. The main reasons for involving a statistician in applied research were, according to this study, after collecting the data and when planning the study, but, in general, statistical contacts had a low priority, especially among supervisors. The lack of experienced statisticians and lack of a common language were reasons for applied scientists to keep to well-known statistical approaches, disregarding the appropriateness, without involving statisticians.

Comparability with other studies, communication with other researchers and acceptance were important factors behind the preference for well-known statistical methods. On the other hand, statistical traditions were not so important for 29 of the 41 doctoral students, who preferred the choice of appropriate methods. However, lack of knowledge concerning new statistical methods among supervisors, researchers and statisticians is still a hindrance to the choice of novel statistical methods. The lack of

understanding of the relationship between the measurement properties of data and the choice of statistical methods of analysis among statisticians and applied researchers is a global problem (Nelder, 1986; McPherson, 1989; Greenfield, 1993; Hand, 1996; Bishop, 2000; Jolliffe, 2001). There is therefore a need to train both statisticians and applied researchers in order to produce good-quality research.

This study also confirmed that there is a potential conflict between the use of non-standard statistical methods in applied research and the well-known traditional methods, in terms of acceptance by referees and journals. According to Lesser and Parker (1995) the best intentions of biostatisticians to provide a thorough statistical analysis could be counter-productive and result in unfavourable reviews by journals. It is common that editors of journals in applied research fields suggest that description of statistical methods used in a study, even when the methods are uncommon, should be minimised or replaced by a reference to a statistical paper (Jolliffe, 2001). I have as yet experienced very few exceptions. For pedagogical reasons editors have accepted a comprehensive demonstration of new statistical methods for analysis of data from rating scales that were reformulated, demonstrated and explained in an understandable way for applied scientists (Sonn & Svensson 1997; Gosman-Hedström & Svensson, in press; Claesson & Svensson, 2001).

The lack of knowledge concerning the research process and statistical methods for the various applied problems is also common among editors and referees. Altman (1998) recommends that biostatisticians should review papers in medical journals in order to increase the quality of medical research.

The need for knowledge in basic statistics and scientific competence among the applied scientists was one of the most important factors for communication with statisticians. Important factors for the optimal interdisciplinary communication suggested in this study were seminars, workshops and courses for research groups and statisticians and inter-disciplinary communication in all research projects. My experience of the research courses in practical statistics for study groups, including the supervisors, is that the group members gained confidence in statistics and developed a higher level of awareness concerning the choice of statistical methods appropriate to the measurement level of the outcome measurements (Svensson, 1998c). The teaching model of the International Clinical Epidemiology Network (INCLEN), as experienced by Bangdiwala (2001), provides training of applied medical researchers in statistics and statisticians in clinical epidemiology methods, but could be applied to health related research problems as well. Bishop and Talbot (2001) propose an approach to training applied researchers in statistical thinking with attention to the entire research process.

Another way of eliminating a potential conflict between members in a research group is to give seminars concerning the relationship between the applied research problem, the measurement process, other design issues and the appropriate statistical methods. This approach would also improve the communication skills among statisticians and applied researchers and stimulate the interdisciplinary knowledge. Targeted seminars reflect the teaching-learning process of consulting, when the members of the research group and the supervisor are present. According to my experience, supervisors appreciated this possibility of up-dating their statistical knowledge with focus on the relationship between their complex research problems and the statistical possibilities and restrictions of application. Seminars and workshops focusing on specific applied research problems would meet the need for continuous training in statistics. New statistical methods and software might have an influence on applied research problems and vice versa, as practical problems stimulate statistical methodological research as well (Greenfield, 1993; Svensson, 1993; McPherson, 1989;

Jolliffe, 2001).

As a result of this study, students in statistics, statisticians and applied scientists are invited to a new series of symposia concerning statistical problem solving and interactive communication in medical and health sciences arranged by me at the Örebro University in Sweden. Each symposium will have a theme, such as "statistical aspects on medical diagnostic tests", "repeated measurements", "the measurement process and statistics", "statistical aspects on rating scales and questionnaires", "on significances", and will normally contain two half-day lectures held by invited statisticians and applied scientists.

The lack of biostatisticians, especially with experience in statistical evaluation of data from rating scales and questionnaires, is a major hindrance in inter-professional communication concerning qualitative assessments. From my experience, most teaching of theoretical and practical statistics are focused on methods and models appropriate for quantitative data. Therefore, well-educated statisticians may be virtually unaware of the fact that there are statistical methods that take into account the rank-invariant properties of data from rating scales. The controversy concerning the choice of statistical approach for data from questionnaires and rating scales is not only a sign of the lack of knowledge of appropriate methods for ordered categorical data, but also reflects the statistical and methodological complexity of subjective assessments. A review of the scientific literature in which statistical methods have been applied to rating scales and data would certainly reveal a high level of ignorance of the non-metric measurement properties of ordered categorical data.

This study showed that there is a need for more biostatisticians with an interest in collaborative research, not only for the improvement of the applied research but also for the development of the bio-statistical science. The statistics departments should therefore inform statisticians about the applied research fields that provide both statistical and educational challenges. All biostatisticians should have experience of collaborating with research groups, and should be familiar with the importance of the measurement process for the choice of statistical approach. There is not only a need for statistical knowledge, but also a need to be able to listen, to show interest in applied problem solving and to be able to transform abstract statistical descriptions into an understandable applied context. Statistical consultancy offers a good practice in the communication skills and so does the participation in workshops and applied research (Greenfield, 1993; Nelder, 1986; Preece, 1987; Belli 2001, Jolliffe 2001, Godino, Batanero, & Gutiérrez- Jáimez 2001).

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