Communication, Collaboration, and Consulting

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1. Introduction

Any form of consulting is a two-way process, and statistical consulting is no exception. Both the client and the consultant need to be able to communicate with one another. Good communication, enabling the statistician to understand the research, and the client to understand and appreciate the contribution that the statistician can make, is more likely to result in collaboration than in the case where there is poor communication. In this latter case the statistician might well be regarded simply as someone who has provided a service, rather than as a full member of a team.

In a section of an earlier paper (Jolliffe 2001) the interaction between the statistician and the researcher in a consultancy session was discussed. In this paper the communication that takes place in a consultancy session between statistician and client, who might for instance come from industry or business rather than from a pure research environment, is considered in more detail.

2. Increasing the market for statistical consultancy

There are a number of reasons why statisticians are consulted. In some cases it is fairly negative such as a requirement for a statistician's name on a funding application, or a belief that a paper would not be accepted for publication unless it included p-values, or for help in interpreting the results produced by computer software. More rarely, perhaps, a statistician will be approached because the client is aware of the importance of statistics and of obtaining statistical advice.

In the course of a consultation, clients might realise that it would have been better to have consulted a statistician earlier. The hope is that they will come earlier in future. If a client is pleased with the outcome of a consultation session with a statistican, then there is a possibility that he or she will come back on another occasion and will tell others how useful the meeting was. Personal recommendation is the best advertisment.

However, statisticians, both individually and as a professsion, should perhaps be more proactive in promoting the contribution which statistics and statisticians can make in almost every field of inquiry (and see Nicholls 2001). They might point out the benefits of consulting statisticians and how this adds value, find out what potential clients do and suggest that they would be willing to discuss, in general terms, how they might help in a particular project. Even statisticians who are employed by an organisation to give advice might need to do this. It might be necessary to overcome a few misconceptions, for example that statisticians are not needed in qualitative research, and that statisticians are not needed when designing a questionnaire.

One way to sell statistics is to build on success stories, and to publish case studies demonstrating its usefulness. Attending meetings and publishing papers in journals in an application area, especially if papers are the result of a successful collaboration, will help a statistician become known and respected. It is all to do with communication. "Our audience, our customers, are out there. They need us, even if they do not realize it. We must change our culture, our philosophy, our public relations and our use of language in order to reach them." (Greenfield 1993)

3. Helping the client to consult

On occasion clients seek statistical help over the telephone or through written communication, and it might be necessary to explain the importance of a face-to-face meeting, in

particular the necessity to see the data (Chatfield 2002). Clients often under-estimate the time needed for a session – "It will only take ten minutes" - or for the statistician to work on the problem. It is not always possible to give an immediate answer, and the statistician could well have other commitments. Clients might need educating on all these points. Allowing an hour for an appointment usually gives the client enough time to present and explain the matter on which help is needed and to answer any questions the statistician has. It is usually more fruitful to arrange a further appointment rather than continue into a second hour. It is up to the consultant to set and make clear boundaries and deadlines, and if this is done the client is more likely to focus on the problem and less likely to have unrealistic expectations. Ending with a summary of the meeting and outlining the next stage, if any, is a good idea.

A client who has little or no experience of consulting a statistician might need some guidance as to how to prepare for an initial consultation. Issuing guidelines (Belli 2001) can be useful. Clients should be advised to have available as much information about the study as is feasible in a meeting. It is helpful to the statistician if the client gives a brief description of the project, as the context of the statistical query is important. The author has in the last few months dealt with queries relating to army worms, air pullution, and assessment of the extent of rot in yams, and in all these cases the special nature of the problem was important in considering the statistical aspects. Here the client needs to know how to communicate, but the statistician can help by asking for further explanations when needed, for example of abbreviations and specialist terms. In an ideal situation the statistician would have some knowledge of the subject field, but willingness to learn and to visit the client's place of work will encourage the client.

Pertinent questions from the statistician can also help the client formulate the statistical question. For instance, that well-known innocent question "What size sample do I need to take?" from a client leads, as statisticians know, to a whole series of questions to the client. In general, questions about the purpose of the study, and how results are to be disseminated, will be important in deciding what advice to give. To some extent the statistician is a facilitator and if the client and statistician can together determine how to collect, analyse, or present data, the client will retain ownership of the project, but perhaps will welcome the statistician as a collaborator. As the statistician can step back from a project, the statistician's comments will sometimes cause the client to re-think ideas, and this in itself is a useful contribution. It is worth remembering that the statistician will almost certainly know more statistics than the client and that the client might be frightened by statistics.

There are many opportunities during a consultancy session for helping a client learn when to consult a statistician and what questions to ask. Tact is needed of course. It might be tempting to say that the design which has been used in an experiment was poor and that advice should have been sought earlier, but doing so is likely to alienate the client and is unlikely to lead to future collaboration. A better approach might be to find out why that particular design had been used and to suggest alternatives. In some cases practical constraints in the field, on time and on money place severe limitations as regards what can be done.

Students sometimes get some experience of being clients if they ask for statistical help when preparing projects, but are not necessarily helped in this process, especially if they are advised by a statistics student who is learning how to act as a consultant (see section 4). Very few statistics courses given to non-specialists include anything on the process of consulting with statisticians, though there might be some attempt to point students in a statistician's direction. For example, the statistics component of a course on research methods to MSc students in Sustainable Agriculture or Natural Resources included as two of its objectives (Jolliffe 2001):

- To encourage students to consult with statisticians when they have reached the limits of their knowledge of statistics or wish to check they are applying their knowledge correctly, and to give them the confidence to approach statisticians
- To emphasise the importance of planning in studies involving statistical analysis and that statisticians can give useful advice at this stage

4.   Helping the statistician to act as consultant

There have been many publications related to the training of statisticians in the art of consultancy. Most mention the importance of written and spoken communication skills, and some also mention interpersonal skills. In fact to be effective, communication between statistician and client has to involve listening and questioning skills (Jolliffe 2001), what Mackisack and Petocz (2002) call a desk-side manner. Consulting also involves pedagogic skills as in many cases the statistician will be teaching the client something about statistics and extending the client's knowledge of statistics during a consultation. It is so easy now to produce masses of output with menu driven statistical packages that the consultant might well have to explain why the analysis is inappropriate or discuss the interpretation of the results of an analysis which is beyond the client's statistical expertise.

Although by no means universal, teaching of statistical consulting is now taking place in some higher education institutions. Some courses are specifically on consulting, for example Bangdiwala et al (2002), Jersky (2002), Mackisack and Petocz (2002), whereas other courses incorporate an element of consulting within them (Jolliffe 2002). Students on such courses experience consulting in the form of role play, or by advising students or staff from other departments, or persons external to the institution. Consulting is best learnt by doing. It is hard to teach, but important to learn (Belli 2001). Mackisack and Petocz (2002) discuss some of the issues involved in running a consulting course. Recent books which could be useful in preparing sessions on teaching consulting include Cabrera and McDougall (2002), Derr (2000), and Peck et al (1998). Some discussion on teaching consulting and other references are given in Jolliffe (2001).

Teaching statistical consulting as part of studies in statistics is relatively new. Many practising statisticians have had to learn how to consult by doing it, reading about it, and talking to others about it. Some are able to learn consulting skills by working with a more experienced statistical consultant for a while. Workshops on consultancy are another possibility. Many clients will need little more than help with organising and presenting their data (Chatfield 2002, Jersky 2002), but in other cases their problems will involve advanced methods and on occasion might present statistical challenges (see Peck et al 1998 for examples). The statistician might then wish to discuss the problem with colleagues. A "general" statistician is more likely to realise that a statistical method not normally used in the client's area of study is appropriate than a statistician who is a specialist in advising that type of client.

The statistician should try not to use too much statistical jargon or too many statistical terms when talking to clients as these might be unfamiliar, and should communicate with the client at a level appropriate to the statistical knowledge of the client (Greenfield 1993, Jolliffe 2001, Nicholls 2001). This might involve learning what statistics and statistical terms are familiar to the client. Sometimes client and statistician will attach different meanings to one and the same word. Attending courses in subjects other than statistics gives statisticians knowledge which might be useful in understanding the context of clients' problems, but statisticians will become familiar with subject areas on which they give statistical advice, and this in itself will help them to act as consultants.

5.   Collaboration

If there is the chance of collaboration with a client, the statistician needs to make clear what form that collaboration might take. Otherwise it might not occur to the client that the statistician could be an equal partner and not just a provider of a service. Making a distinction between client and consultant might be counter-productive. Referring to one another as collaborators could improve the relationship.

Collaboration could mean writing a joint report of a study or a joint paper. An acknowledgement for statistical help is not sufficient. This is important for the public image of statistics and statisticians. The situation that Chatfield (2002) experienced of being acknowledged in

a publication containing some doubtful statistics needs to be avoided if possible. On occasion two reports might be written with the client taking the lead for the report for a non-statistical readership, and the statistician taking the lead in the report for statisticians. Making joint applications for further funding is a sign of successful collaboration.

Finally, collaboration is more likely if statisticians embrace some of the newer methods which are evolving such as data mining and neural networks, and if they can convince editors of non-statistical journals that statisticians should be involved in the refereeing process of any papers involving statistics, however minimal. Statisticians must reach out to others if they are to be consulted and to become collaborators in fields outside of statistics.

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RÉSUMÉ

Une consultation entre un client et un statisticien se passe mieux si chacun parle la langue de l'autre. L'auteur fournit des suggestions pour une bonne interaction. L'article est presenté dans le contexte où le statisticien veut travailler en partenariat avec son client.