

spreadsheet for analysis. This could advance human nutrition as it would permit a greater throughput of samples and less error in re-keying data. Email gives the scientists greater control over the logistics of questionnaire despatch. Large mailshots of the same message are possible and most email packages allow the sender to confirm a message's delivery time and time of reading by the recipient. From our study, the fifty-six unknown addresses were all returned within 40 min of despatch and of the 204 'hits', the majority (183, 90%) were opened and read by the students within 5 h.

Careful consideration is required of the ethical issues surrounding the use of email as a research tool. Email can not preserve the anonymity of the respondent. This may compromise the validity of electronic questionnaires although scientists could make assurances of confidentiality.

In conclusion, there are significant uncertainties about the use of email as a research tool in nutrition science. Although it is likely that email users will become more representative of the general population over the next decade, I suggest that, at present, only very narrowly defined populations with protected access, i.e. individual email addresses, should be contacted using email as a research tool in nutrition. The continuing development of software will improve the delivery of questionnaires by email and the Internet (Schmidt, 1997). Selwyn & Robson (1998) argues that: 'at the present time using e-mail offers the researcher many advantages, temporally, spatially and in terms of easy access to otherwise unreachable samples'. There is a substantial need for experimental research to be carried out to test the validity of electronic methodologies as reliable alternatives to well-established methods. Only if nutritionists increasingly engage in this scientific process can peer-reviewed criteria for the use of email in nutrition research be developed. I invite comments and the collaborative exploration of some of the issues raised by this letter.

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### Using the Internet in nutrition research – reply by Wise

Nutritionists should be encouraged to make the best use of recent developments in information technology in teaching (Wise, 1998a) and research (Wise, 1999). The letter by Eley (1999) with regard to using the Internet for research raises some interesting ideas on computer use that deserve comment. She suggests that we might use email to send questionnaires to subjects, who respond by email, and that the files returned could be entered into a spreadsheet for analysis. Any published information relating to the Internet

will suffer from the results of the rapid evolution of this medium. There are many questions raised by our students' use of the Internet as a source of information, especially with regard to referencing the material. There is no control on the material so it is not refereed, nor is its presence on the Internet guaranteed tomorrow. I can provide more recent information on the Internet than she has done in her letter simply because it has taken time to publish that information in the traditional fashion and it is now out of date. References

to the Internet might be given a slightly higher status than 'personal communications' since any web surfer can read them, but they are given with the proviso that when the reader tries to access them, they may have been updated or removed.

The main ideas arising from her letter that I would like to discuss relate to sampling bias and the consideration of another approach using the Internet that could be added to her concept when considering this subject. There are ongoing surveys into Internet use, particularly in the USA; for example, CommerceNet (1998) found that 43% of Internet users are women, which would infer that trends towards equal representation of the sexes are progressing. This contrasts with the older published study in the USA, quoted by Eley (1999), which stated that a high proportion of Internet users were male. This suggests that the sampling bias in this regard is now less than inferred in her letter. There is now even a site specializing in exploring the ways that producers of Internet services can target their products at female Internet users (ZDNet, 1998). One of the problems with email that Eley (1999) alludes to is the growth of 'junk-mail' or spam, one of the results of the commercialization of the Internet, and organizations have been established specifically to fight against it (Netizens, 1999). It is, therefore, important that we should not be accused of increasing what, to other people, is spam, and that they are not automatically deleting email that does not come from recognized sources. This would reduce the response rate, as would the common tendency to read an email and intend to deal with it later, but forget to do so.

Eley (1999) reports a study in which the people emailed were students in a single university; this is relatively simple to do because there is a list of addresses within a single organization. At present, one of the problems with the Internet is the great difficulty in finding an email address for an individual, although there are various search strategies that can be adopted (Seymour, 1999). Use of email as a research strategy would be likely, for the foreseeable future, to rely on address lists within organizations that agree to participate in the research.

Another potential strategy that can be further investigated involves using the World Wide Web to attract potential subjects for the research. Two types of program can be written: client-side and server-side. An example of the former is 'WebDiets', an interactive program, in which people simply click foods on the screen to include them in the diet and click them again to deselect them; they can see the nutritional analysis in a bar chart and a face interprets the diet for them (Wise, 1998b). This type of JavaScript program is limited in the amount of data that can be used because it must be transferred to the client's computer over the Internet. It could, however, be written to include a 'submit' button that sends information entered by the user in an email message to the researcher. This would be similar to the idea in her letter, but differ because the subject is visiting the site voluntarily. An example of a server-side program is 'Nutrition Analysis Tool' (University of Illinois, 1998), in which the user enters information about a diet and this is sent to the server, where a database is queried, leading to the return of a page of nutritional analysis to the user.

When the data are received by the server, they could also be used for research purposes. An example of such a study is provided by Yochum *et al.* (1998), who set up a web page with a food-frequency questionnaire and this attracted visitors who completed it, along with their name and address. Some of the participants were later sent a paper version of this questionnaire by post to compare results with the data received electronically. Clearly the sampling method for this type of research does not fit any of the recognized methods. Whilst the stratified random sample is perhaps a gold standard, much research uses strategies that are far from this. For example, in some papers, samples are described as 'convenience' and in others a 'snowballing' technique is employed. Therefore, for certain types of research it may be acceptable to use a sample of people who visited a web page, as long as they entered details sufficient to classify them. For example, a study that asked people to compare various statements about nutrition might be able to show that certain categories of person responded more positively to one statement than to the others, and this might then be useful information when writing nutrition education leaflets.

In conclusion, there may be merit in emailing questionnaires to participants within certain organizations because a list of email addresses is available. Another interesting approach may be to attract (or invite by email) people to a web page containing a questionnaire that is emailed back to the researcher or uses server-side programming to store answers in a database for later analysis.

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