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## Comment

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Statisticians have traditionally shown a wide range of attitudes to computing, from being deeply involved and enthusiastic to regarding the subject with some distaste, or at least suspicion. In the early days negative attitudes were often strong. As an enthusiastic undergraduate in the early 1960s, I was cautioned by a faculty advisor that, while computers certainly had their uses, actually programming them was not really compatible with a research career.

Current attitudes usually exhibit less outright opposition than feelings of confusion over hardware and software choices, combined with some resentment at the learning and relearning that each new development seems to require. Professional statisticians reasonably want to know how they can benefit from computers in their work. If an overview such as Professor Thisted's paper could clarify this issue, it would do its readers a service. In the present case, I worry that several helpful insights may have been somewhat

buried by irrelevant details, shifts in viewpoint and unnecessarily old-fashioned examples. The reader's overall level of confusion may rise rather than fall. Rather than quibbling with the paper, however, it will be more helpful for me to present, briefly, my own view of the topic.

What are the important points about computing environments for data analysis? Here are two, from which most of the relevant conclusions follows:

(1) Computing environments should be judged by their complete, present and future, contribution to their user's effectiveness.

(2) Most of the important improvements in statistical computing environments have come through advances in general computing, not from anything statisticians have done. This will continue to be true for the immediate future.

Point (1) implies that it is not sufficient to ask how easily the user can carry out a specific current data analysis, important as that question may be. Two other questions must also be weighed. How well does the environment carry out the nonstatistical tasks

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