Computer Systems

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I'd like to say that I'm also new in the area of interest that we're addressing here today. My professional involvement basically centers on defining aspects of design and development of large computer systems. This work involves looking at user needs and user requirements in the early phases of system development in order to define system implications and evaluate different concepts.

Before I give my reaction to a couple of interesting points made this morning, I would like to say that I very much enjoyed the presentation that was given on the hospital information system that has been developed here at Case Western. I found the presentation extremely informative and very much down to earth, with strong emphasis on the basic issues of the system's objectives rather than the mechanics and the technical aspects of computer systems, per se.

Of the key points that were made this morning I would like to further emphasize the necessity to make sure that the user needs are well defined and that they drive the solutions - not the other way around. To put it another way, many times it is easy to describe needs in terms of specific system solutions that we already have in mind - specific hardware, software, what have you. I believe the key here is to describe and define the needs to the greatest possible extent. Thus, a user's particular needs can be translated into a complete set of user requirements, independent of any predefined system solutions.

Further, even after the user requirements have been defined, they should be reevaluated throughout all phases of systems development. Therefore, evaluation and reevaluation of the requirements is an integral part of the systems development process. The importance of this point is further emphasized by the fact that today's computer technology is so advanced in terms of what's available out there - in terms of hardware, in terms of software, in terms of data bases management languages of all different types. There's just an abundance of solutions in terms of combinations of different elements of systems that we can put together to respond to a set of needs.

The tendency to do this is one that we've somehow got to stay away from. Again, we must describe and define user needs

independent of solutions, techniques and methods that we have in mind, and perform as much analysis as possible in the early phases of requirements definition. In addition, in the early phases, we must look at as many different system concepts as possible, and not just one preconceived solution. This ties in with another issue that I want to raise - the question of different solution methods, different concepts. How do they compare? I'm talking about cost-benefit analysis or effectiveness analysis or whatever you want to call it. To me, the biggest difference among systems lies in the extent that the solutions they provide are responsive to the user's requirements. Obviously, someone could ask, to what extent can we completely define requirements, needs? Or, simply, can we define them? Well, we can't.

And that is where the question of flexibility comes in. Everybody says we've got to develop a very flexible system. Well, how do we define flexibility? There are those who can carry this idea of wanting to develop a flexible system to its ridiculous extreme. They would like to design the most flexible system, whatever that means. In this extreme, the search for flexibility becomes a theoretical exercise, and the service objective is almost lost.

I believe we need a definition of, or some attempt to define and measure, degrees of flexibility. And again, I would like to tie this concept directly to requirements. If we were able to define what we need with 100 percent certainty, the question of flexibility would go away. There's only one solution to it; one system will do the job. Obviously, however, we can't do that. There is uncertainty about the requirements, the needs - even as we know them today. And this uncertainty is compounded by the fact that we're trying to anticipate the future needs. So the question of flexibility, the degree of flexibility to be incorporated into a system, must be answered by carefully assessing the uncertainty about the current requirements as well as by assessing the uncertainty of future requirements.

Another comment that I want to make, again, stems from the points that were made earlier today. One of those points was that the concept of the computer system is not limited to a data base per se. It's a total system, or a capability in terms of a number of system elements, to operate on data to generate information. I'd like to emphasize a distinction between these two terms: data versus information. What makes a difference in terms of the unique needs of different users is the manner in which we operate on data to generate different types of information.

A final comment that I want to make concerns Tony Fisher's discussion on the survey of the producers of products, packages, data bases and what have you in this field. I think conducting such a survey is valuable effort, and I think it's definitely one that all of us here would benefit from. However, as I listened to him, I started thinking, what about the user community? The data users, the product users, if you will. What about a

parallel effort of some sort, where we try to come up with a set of generic requirements among different users?

We need some sort of a systematic way - not necessarily in a survey format, but in some structured format - to make a serious attempt to come up with articulations on the part of each user group to describe their areas of needs. In this manner, these needs can be looked at collectively with the idea of identifying common areas. I think today's afternoon task force sessions, for example, will be helpful for communicating and trying to come up with a baseline from which we can address this concern. And I strongly suggest that there be a written form of some sort through which different user groups can describe their areas of concern and interest.