you too can develop computer programs!

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Historically, Extension has entrusted its potential computer applications to computer programmers and systems analysts. The resulting computer-oriented systems development usually focuses on the "nuts and bolts" of document flow, file structure, precise program logic, and rigid production schedules.

The nature of the computer itself requires formal precision. But this is just the tip of the iceberg. The bulk of the iceberg in systems development is the people. This article puts the technical aspects of computing aside and focuses on the people side of systems development.

With the computer "black-box" myth gradually crumbling in the Extension organization, agents, specialists, and administrators are beginning to recognize that systems development is simply Extension's program development process focused on computer applications. Likewise, we're beginning to recognize that effective Extension systems development requires people-oriented expertise.

What the computer does for us must be processed and determined by the end users. That's us and our clientele. We don't need to be computer experts to achieve productive systems. We need to be skilled in applying the program development process in working with clientele, advisory groups, volunteers, agents, specialists, administrators, computer programmers, and systems analysts involved in systems development.

People Involvement

The key message about program development (systems development) is involving people throughout the process. "Program" could be substituted for "systems" throughout this article. The extent of this involvement varies depending

on the social and political situation and the problem being addressed. Not involving the end users in the design of the proposed system dooms it to failure.

In developing an Extension educational program that requires a new computer system, another group of people new to the process is involved in the development. This is the group of computer experts. These people help us "translate" our idea and design into a computer system. It's our responsibility to determine through the program development process what information a system is to produce.

The Extension professional plans, coordinates, facilitates, communicates, and manages the educational program development regardless of whether a computer is used. Just like any other educational program development that involves people in creating a useful package of information, after the preliminary design, we seek technical experts to help build the package. They must understand precisely what we want the computer to do before computer programming can begin. Their understanding is based on our communicating what's needed and what we want done.

This is complicated by the fact that frequently the computer experts know little or nothing about Extension. Clearly, control in Extension computer systems development is in the hands of Extension professionals. The same skill and knowledge used in the educational program development process apply to computer systems development.

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Problem Definition Developing a system should be based on an existing problem. Be cautious of computer solutions (systems) that don't address clearly defined problems. Such "solutions" habitually become problems. Computerizing the existing system usually only complicates the problem. It solves nothing. The systems development process should be viewed as the means to solve the problem, not just computerize it. A revealing key question to answer is, "How will the information generated by the system be used?"

Analysis and Synthesis *Analysis* is done to learn about the whole problem and alternative solutions by examining their component parts. *Synthesis* is done to learn about the whole problem and the

alternative solutions by blending the individual parts into a harmonious whole (system). This may require creating or discarding component parts.

Systems Design   Traditionally, computer programmers and systems analysts insist on identifying system requirements by: (1) output, (2) files and processing requirements, and (3) input. This serves to rationalize the input to the computer, producing (probably) a machine-biased system. By the time the design team is well into the "files and processing requirements" step, they're psychologically resistant to changing the "output" step. You're assured, however, that the end product will function on the computer.

This isn't comforting if the system fails to satisfy the people-needs of clientele and Extension. The rigid design procedures of computer experts are generally based on an already thoroughly processed identification of system requirements. This must occur on Extension's people-intensive side of systems development.

The three-step procedure outlined above isn't appropriate for the people identification of system requirements. It's not critical to begin with output, files, or input, but rather to apply a non-jargon, alternatives-oriented, iterative process of all three steps toward increasingly detailed specifications to reach an acceptable design. Systems design is a process reflecting increasingly detailed documentation of what the system must do. Only the final steps of systems design are machine-intensive and require the help of computer experts.

Subsequent to Extension's completing the preliminary systems design, detailed machine-intensive specifications are developed and documented by the systems analysts and programmers. These specifications represent their understanding of what the Extension design team has communicated. They should be reviewed by Extension before programming begins. It's much easier and less costly to revise detailed design documentation rather than computer programs.

While reviewing the documents, keep in mind that the system must be simple and practical to operate. It shouldn't take a programmer to operate it. On completing the review, programming, system testing, and debugging are performed by the programmers and analysts. Simultaneously, developing the training package(s) and final plans for implementation are topics of primary concern for Extension professionals.

Training   The best training explains and shows rather than tells. Training should consist of general instructions in methods to

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be used, why the system is being introduced, description of how the system works, operating procedures with practical sessions on completing forms and using output, and on-the-job training. Training isn't the time for persuading people to accept the system. If they've been involved from its inception, they'll probably accept it.

Implementation

Convenience and ease of use govern the strategies for systems implementation. Here are four basic strategies for implementing a new system: parallel, pilot, gradual, and immediate. A combination of these applied to the specific circumstance and situation is frequently the optimum strategy.

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Evaluation

Systems development isn't complete with the implementation. Though evaluation involves the continual feedback occurring throughout the systems development process, it's stressed during the post-implementation phase. The key questions to be addressed are:

1. Has the system resolved the problem and met the objectives?
2. What improvements are needed?
3. Have the system's requirements changed?

Such an evaluation should occur frequently to ensure that the system is working for people.

Summary

In many respects, systems development is the Extension program development process applied to computers. The bulk of systems development occurs as a result of people effort. Computer or subject-matter experts should involve end users in the development process. Systems development should be viewed as an opportunity to seek solutions rather than mere cosmetic changes to problems. To be effective, systems must be anchored in people-needs. The alternative of not computerizing should always be explored seriously. The computer is one tool among many.

Extension agents, specialists, and administrators recognize that the key to a productive program development process is

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people involvement. Computer systems development is nothing more than a special application of this process. Consequently, the same principles apply. With the need for computer-based analytic management information growing exponentially, Extension professionals are beginning to play a more significant role in the systems development process.

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