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The New Information Technologies: Challenges
to Agricultural Economics Extension Work^{1/}

by

Gerald R. Campbell^{2/}

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^{2/} The author is Professor and Extension Grain Marketing Specialist in the Department of Agricultural Economics, University of Wisconsin-Madison.

The New Information Technologies: Challenges
to Agricultural Economics Extension Work

As a graduate student in the late 1960's I remember reading an article which forecast that soon each of us would have a computer on our desk. The author saw a world in which instant access to data bases would mean virtually instant hypothesis testing. No longer would answers be given based on educated guesses. The technology would exist to give empirical answers not just suppositions. At the time this seemed rather far fetched. As I looked at the old Monroe 6N 212 calculator in front of me it hardly seemed possible that I would see the author's forecast come true in my lifetime.

In many ways that author's forecast has come true. On our desk's today is a personal computer with access to our own data bases, access through the federal DIALCOM system to the Crop Reporting Board, Economic Research Service, World Agricultural Outlook Board, Agricultural Marketing Service, ES - USDA, AP, UPI, Commodity World News, and so on. With a big enough budget we can access any number of information services and data bases on virtually every aspect of contemporary life. The data accessed can be graphed, regressed, correlated and so on without leaving your desk. The corresponding and related developments in telecommunications expand the horizons far beyond those cited above. Each of us is deeply involved in the "Information Age". We are workers in the growing "knowledge industry".

My assignment today is to look at the challenges that the new information technologies provide to agricultural economists working in extension. The papers that were presented earlier touch on several of those technologies including expert systems, teleconferencing, interactive video disk, microcomputer models and so forth. I will not center on any one of these technologies. I will center on several of the obstacles identified by

these examples and others which challenge our work as agricultural economists in extension. My objective is to raise some challenges which I believe are relevant to our future mission and productivity. These are not so much new issues. Rather it seems to me that these challenges are accentuated by the technology now at hand.^{3/}

Can we move toward consistency in concept and method?

We all have a general idea of the subject matter which is contained in agricultural economics. We use a "common" language. However, the development of teaching methods employing the new information technologies challenges us to reach a greater consistency in our concepts. This is essential to the wide spread adoption of these technologies and to their transportability across regions. An example from recent experience in developing a regional publication may help illustrate the problem.

Understanding the concept of "basis" as a particular price differential between cash and futures prices is important in using futures markets. A substantial amount of work in marketing extension has involved teaching about "basis" and the implications of basis change for hedging. It turns out however that among agricultural economists the calculation of the "basis" differential is not accomplished in a standardized way. Some calculate basis by subtracting the cash price from the futures price some calculate basis by subtracting the futures price from the cash price. As one can easily see this is not a trivial matter. A "narrower basis" meaning a smaller differential implies different things depending on the way that the basis is

^{3/} Because this paper represents a series of impressions gleaned from a number of sources it does not include citations. Rather I have included at the end of the paper a list of general references which have influenced my thinking.

defined. Interpreting a graph of basis through time depends on knowing how the underlying data was computed. Once sensitized to the inconsistency in the way basis is defined we learn to seek out new ways of expressing our ideas.

It seems to me that the problem of inconsistency is quite widespread. We have heard it referred to in the case of cash flow analysis. We know it exists in farm record analysis and budgeting and so on. The challenge is to move toward consistency as we move toward the use of new information technologies. We need to be sure that we are developing teaching materials that get at the essence of the concept we are trying to teach. To fall back to the basis example used above the essence is the concept of price differentials between markets the factors that influence them and the implications of changing differentials for a trader active in the two markets. If we can develop a teaching package which is founded on these basics it can be adopted widely regardless of personal preference for a particular definition or style of presentation. The scale economies apparent in the development of computer software and video disks makes wide adoption essential. We have a real opportunity to work together to build materials that form foundations for differentiated local extension programs.

How will we deal with information disintermediation?

We have seen the term disintermediation used in recent years mainly to refer to developments in financial markets. However, we are surely seeing the same phenomena in the distribution of information. As I remarked earlier it is now quite easy to access a large number of data bases. In many cases this data is now available to those who formerly would access the data only through some intermediary--a county agent a state specialist a banker and so forth. Access through the intermediary usually provided an element of

interpretation and evaluation of both data quality and conclusions that could be drawn from the data.

This easy access to data and information is hailed by many as one of the liberating influences of the information age. It facilitates "networking" and the rapid exchange of information among interested groups. Today the most information oriented farmers can know on a day to day basis more about the happenings around the world than most of us do. If we defined our role in the past as "information providers" in some sense we are threatened by this changing information access. For those who stake their extension career on being the primary source of the latest facts on the market, or tax law, or revenue sharing, or water rules or farm policy the new information technology is a two edged sword. Surely this technology makes their job of accessing and analyzing information easier. Simultaneously, however the new information technology makes it easier to bypass extension as a source of the facts.

The changing role of agricultural economists as information intermediaries provides at least two challenges. First, we need to recognize that there will continue to be a need for the kind of information provision that we have done in the past. Clearly not all of our clientele will be plugged in to a network which provides the information they need. We will also continue to use the demand for information to capture the teachable moment and get a little basic economic knowledge thrown in with the flow of facts. Providing Outlook Information as the bait for economic education will continue to be an attractive tactic. Secondly, the easy access to information sources will create a growing demand for the knowledge skills needed to use that information. I think that there is a growing clientele who are information rich but analysis poor. These clients are much more

prepared to learn economic principles which help them understand and interpret the facts which they now have available.

Can we sustain the county, state and federal partnership?

The new information technologies clearly challenge existing institutional arrangements among units of the extension service. The tendency for information to flow outside of a hierarchical line structure has been around as long as have organizations. The new information technologies simply provide for information flow that makes a reliance on a hierarchical structure laughable. A recent illustration in my own case concerns a paper on Generic Commodity Certificates prepared by a task force organized by ES-USDA. Through direct access to the DIALCOM system I was able to acquire that paper and distribute it to county faculty a week prior to the time I received a copy of the paper from my state program leader. If our counties were directly linked to DIALCOM they would have had the paper even faster.

A second example of the challenge to state boundaries are the expert system and videodisc. Clearly the technologies we heard discussed earlier today are likely to be distributed widely. The distribution of these technologies across state county and federal lines is not likely to be confined to a system of endorsements at county, state and federal levels. Users will seek out these information resources with little concern for their connection to local institutions.

Teleconferencing also challenges traditional boundaries. There is no technological reason why a teleconference cannot span several states, the nation, several countries and so forth. It would be as easy for a Wisconsin farmer to participate in a Purdue teleconference as someone in Indiana. If the teleconference were organized in a particular way there would be no need

for any central gathering. The participants and the presenters could each be at a different location.

Our challenge is to help mold an institutional structure which facilitates the use of the new information technologies. In my view the most critical aspect of such a structure is an incentive mechanism which encourages multi-state cooperation in program development and execution. If such a structure is not forthcoming the advantage of the new information technologies is likely to be less than fully realized.

I regret to say that from my vantage point our current financial crises in Cooperative Extension are moving us away from regional cooperation. When things get tough our current institutions protect the high visibility local effort which can be clearly tagged with the state CES logo. State policies toward software development and distribution carry a similar bias toward local product identity. I recognize that this is a complicated issue but the new information technologies challenge the artificiality of political boundaries to a degree never before experienced. The scale economies in the production and dissemination of electronic educational materials are simply too great to conceive of their duplication in every state.

The technical ability to meet some of the concerns of local and state groups is clearly with us. All of the national news magazines now produce weekly editions which are customized to the extent of advertising for local business. I recently heard an estimate that Farm Journal had produced over 8000 different versions of a single monthly issue. It is today clearly technically possible to develop educational materials around a central theme in which the delivered product is "customized" to any level for which data is available.

Can we fit our solutions to our clients problems?

One of the frustrating institutional barriers to extension work is captured in the observation that "people have problems and universities have departments". Agricultural Economists working in extension compound the gap further with specializations within agricultural economics. Our pragmatism has help us overcome these compartments to bring economic knowledge to bear on peoples problems. In some sense this ability to jump the gap from problem to concept and analysis is the art of extension work. It seems to me however that in adapting the new information technologies to agricultural economics extension work there is a real challenge to understand the problem clearly before an information technology solution is brought to bear. It is all too easy to provide an information technology solution that is incomplete in handling the problem.

In the past the limits of our technical ability and the predisposition to comparative static analysis has pushed us toward "partial" problem solutions. Todays technology makes it possible to handle extremely complex problems without effective computational constraints. This challenges to further break down the barriers within our profession and between departments in our colleges to develop educational materials which reflect the complexity of "real" management decisions.

In my view we are also challenged in this area by the limitations on our understanding of how farmers actually make decisions. To my knowledge we have a severe scarcity of knowledge on contemporary farm decisionmaking. We can build models which behave like experts. Unfortunately the most accessible experts are our fellow economists. Maybe we should be devoting some work toward expert systems which embodied the skills of our best farmers.

Can we fill the data base gap?

One of the key elements of the new electronic technologies is their ability to sort, retrieve and analyze data. In addition digital communication means that data once digitized can be disseminated at very high speed. Further the marginal cost of an additional data user is very small. All of these features have resulted in the ability of computer and telecommunications technologies to expand the use of electronic data immensely. The focus of this activity to date has been on giving access to data collected for one purpose to those who could use it for another purpose.

The original development of information "utilities" such as the "Source" and "Compuserve" were built on the existing data services of these companies for commercial clients. They discovered with little further investment they could exploit the sunk cost of data collection and analysis by offering additional users access to the data "after hours". This is a classic case of price discrimination and market segmentation. This practice has grown to cover the secondary distribution of many kinds of information.

In agriculture public ventures such as AGNET and private companies such as AGRI DATA Resources have also made extensive use of the re broadcast of information collected primarily for another purpose. These information services have expanded significantly the access to many of these data bases. However, the problem remains that access is to data that is collected for another purpose. Much of the data that might be most helpful to farmers in their decision making is of such a localized nature that it is not likely to be profitable for it to be collected by proprietary firms. Examples include local market prices, rainfall, degree days, and input prices.

It has been asserted by some that the county extension office of the future will include a computer with local data bases relevant to local farmer

decision making. If this is to come to pass it will require a massive redirection of local extension office activity. It is very expensive to collect and maintain high quality agricultural data. Most extension offices have no one trained in data collection. Beyond casual surveys and efforts to keep current with what is going on in the county, extension has not been a data collection agency.

If we are to capture the power of the new electronic technologies in local decision analysis we will need to devote a large portion of our time to helping solve the problem of inadequate local data. We may need to be reminded that the beginnings of our profession trace to farm records. The new electronic technologies give us tremendous power to analyze data. They give us the opportunity to use "simulation" and "what if" testing as "demonstration plots" for our clients to see. For these demonstrations to be believable however, they must be based on sound local data. I expect we will meet this challenge by engaging in some primary data collection. We may find however, that our primary role will be continuing to work with farmers and agri-business firms to help them understand the virtues of sound data.

Can we develop effective materials development teams?

The new electronic technologies require knowledge that is not possessed by most agricultural economists. We find our access blocked by technical and administrative barriers which condition the availability of these new methods. In some cases the challenge is to break the inertia of habits built up over the years which gave each of us exclusive control of materials preparation and presentation. The new methods simply offer too much potential for us to let current systems slow us down.

We need to press to have the technological assistance we need to take advantage of these new methods. We need to be sure that we continue to be in control of subject matter content. But we need to learn how to work with others in getting that content delivered most effectively.

On many of our campuses we are faced with administrative rules which put the technology experts in charge of access to the technologies. If we are to meet the demands that are being placed on us by tight budgets and limited staffs we must press to have access to the technology that is available.

Can we get serious about evaluation?

Probably no subject gets more suspicious reaction among extension workers than evaluation. We have been put under continuing pressure for accountability. All of us have seen questionable evaluation and reporting method forced on us. The new information technologies have dimensions which demand that we evaluate their use carefully. First, they are expensive. The cost of developing things like expert systems. Videodisc systems, video teleconferences can run to hundreds of thousands of dollars. We need to be sure that those expenditures are made with documentable improvements in educational results.

Secondly, the new information technologies have a high degree of what I call the "shazam effect". They generate a lot of interest because they are full of new experiences. Can we document that beyond the "shazam" they produce lasting results. We have the skills to study the "efficiency" of these new technologies. We need to get serious about program evaluation. The new technologies give us a good reason to turn our concern about past evaluation systems into creative ways to really measure our impact.

Summary

The new information technologies we have heard about today create opportunities to increase our efficiency in information production and dissemination. They promise improved effectiveness in learning. However, these technologies present a number of challenges to our current behaviors and institutions. I believe that the strength of these challenges is sufficiently great to require our immediate attention. Perhaps we will find in the opportunities these technologies offer significant incentives to overcome the inertia of the past. As Agricultural Economists working in extension we have a great opportunity to be leaders in meeting the challenges to clarify our concepts, define our role as information providers, develop new institutions for educational materials production and dissemination, refine our understanding of decision processes and information needs, help design effective local data collection processes and help design effective evaluation systems. We have been leaders in the application of computers in agriculture. The rapidly expanding information technologies will continue to challenge that leadership role.

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