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ABSTRACT

A comparative case study investigated the extent of adoption of computer communication in two schools of communication. S. Ram's model of resistance to innovation was used as a theoretical framework. Subjects, 16 faculty at a medium-sized state school in the southern United States and 16 faculty at a large private institution in the Northeast, were interviewed about their use of Mead Data Central's Lexis/Nexis full-text database service and about electronic mail. Results indicated that innovation characteristics are important factors affecting adoption, as are consumer characteristics. Complexity of the Lexis/Nexis service was not a problem for the respondents. Electronic mail adoption was equally low at both schools. A major distinction between the two schools was the difference in the characteristics of sources of information about the innovations--at the state school, respondents said that only informal sources for Lexis/Nexis information were available. Results also indicated a three-level typology of adopters: (1) advocates on innovation; (2) accommodators of innovation; and (3) avoiders of innovation. Findings provide support for considering resistance as an important concept for the investigation of the adoption process, and that information sources may have significant effects on resistance to the adoption of innovations. (Contains 31 notes and 2 tables of data.) (RS)

ADOPTION OF COMPUTER COMMUNICATION TECHNOLOGY BY COMMUNICATION FACULTY: A CASE STUDY

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Despite recent attention to promises of predicted "information superhighways," much has yet to be learned about the processes that affect the adoption of such technological innovations. Furthermore, little is certain about why some communication technologies are accepted while others are resisted.

This research looks at the qualitative nature of the adoption process and examines factors leading to resistance to innovation. A comparative case study method was used to investigate the adoption of online database services and electronic mail by faculty at two communication schools in the United States. Detailed accounts of the experience of adopting computer communication technology were revealed through in-depth personal interviews with two comparable groups of professors.

RESEARCH ON THE ADOPTION OF INNOVATIONS

Many academic disciplines have contributed to adoption research from their particular perspectives, including education,[1] cultural anthropology,[2] marketing,[3] and communication.[4] The most widely known formulation of adoption is that of Rogers.[5] Rogers' model categorizes potential adopters of an innovation by the degree to which an individual or other unit of adoption is earlier in adopting new ideas than other members of a social system. This relative adoption time is defined as innovativeness. The level of innovativeness is normally distributed among adopters who are labeled innovators, early adopters, early majority, late majority, and finally, laggards.[6] However, this typology addresses non-adopters inadequately and neglects the qualitative nature of the actual adoption phenomenon.

The majority of innovation studies published are investigations of innovations that have successfully diffused.[7] This means that unsuccessful innovations have largely been overlooked. This is remarkable given the great number of innovations that have failed despite great expectations.

Examples of rejected communication technologies abound, including educational television in the 1960s,[8] information services such as Viewtron, Knight-Ridder's attempted mass-market videotext project,[9] interactive cable television,[10] electronic banking,[11] picturephones,[12] and quadraphonic stereo.[13] However, studies that have sought an explanation for factors that led to the failure of innovations such as these have been few.

Adoption research has been criticized because of its pro-innovation bias. Pro-innovation bias is the belief that all innovations are beneficial for all potential adopters and that the focus of research should be to more rapidly diffuse innovations.[14] This viewpoint regards any resistance as merely an irrational reaction to innovation or simply something to be ignored as unimportant.

The phenomenon of resistance to innovation has been the subject of few studies and is not well understood. The reluctance of researchers to study resistance to innovation has led to its being called the "less developed concept" in adoption research.[15] The study of resistance considers qualitative factors present in the adoption process, rather than solely charting the rate of adoption over time, as is the case with most diffusion studies.

Ram's Model of Resistance

Ram has developed a model of resistance to innovation that is based in broader resistance to change theories such as those proposed by Heider and Newcomb.[16] Ram suggests that resistance may be found in varying levels throughout each of Rogers' five stages of the adoption process and may continue during the life cycle of the innovation. The level of resistance can range from passive indifference to stubborn refusal and even outright rebellion.

Ram's model enumerates several factors associated with resistance to innovation. These factors are categorized into three areas: (1) innovation characteristics, (2) consumer characteristics, and (3) characteristics of propagation mechanisms.[17] Each of these three areas is made up of several corresponding sub-categories and components.

Rogers established five general innovations characteristics: relative advantage, compatibility, complexity, trialability, and observability.[18] Ram has added six innovation

characteristics to the five proposed by Rogers. These include continuousness, divisibility, reversibility, realization, amenability to modification, and effect on adoption of other innovations.

Ram has specified nine factors of consumer characteristics: psychological variables that include perception, motivation, personality, attitudes, beliefs, previous innovative experience, and demographic variables such as education, income and age.[19]

Ram classifies characteristics of propagation mechanisms such as change agents and opinion leaders based on two dimensions: (1) extent of marketer control, which may range from high to low, and (2) type of contact with the consumer, which varies from personal to impersonal.[20] The role of these factors varies with the innovation's life cycle. Marketer-controlled sources have been found to be greater at the early stages and personal contacts more important in later stages.[21]

Ram's study of resistance to innovation was limited on several grounds. The study was conducted as a laboratory experiment to gauge the effectiveness of attempts to modify the level of resistance to innovations using advertising appeals. Although a high level of internal validity was maintained, the laboratory setting restricts the external validity of the findings. Furthermore, the innovations used in the study were fictional consumer products. These products included such things as disposable paper underwear, bottled banana juice, freeze dried beer concentrate, and roast beef-flavored chewing gum.[22] This artificial quality may not yield cognitive and affective reactions similar to those that might be found outside a laboratory situation. Adoption of these kinds of products may not raise the same kinds of issues as might the adoption of a complex technological innovation in a professional context.

METHOD

A comparative case study was conducted to investigate the extent of adoption of computer communication in a natural setting of schools of communication. Ram's model was used as a theoretical framework to looked at potential adopters' beliefs about the technologies that might cause resistance to innovation.

The research focused on communication faculty at two schools that have an educational subscription to Mead Data Central's Lexis/Nexis full-text database service. An important feature of this subscription is its low flat-rate educational discount, which makes the service accessible to individual professors at no charge to themselves.[23] From a research standpoint, this allowed control for cost and access factors affecting individuals' use of the Lexis/Nexis system.

Additionally, schools subscribing to the Lexis/Nexis database service were studied because of the importance of this particular service in the communication industry.[24] Lexis/Nexis is widely used by journalists within the industry and the skills involved in using such database services are anticipated to be of growing necessity to future practitioners.[25]

Electronic mail is a technology of growing importance that uses similar hardware and skills as that of online databases. Furthermore, email is available at no cost to individual professors. Given these characteristics, adoption of email was included in this study.

Two communication schools were the subject of the investigation. One was a medium-sized state school situated in the South. The other was a large private institution located in the Northeast. Ram's model was used to develop "how" and "why" questions associated with adoption of computer communication. Focused personal interviews were used to collect the data. The questions consisted of a combination of closed- and open-ended types based on Ram's innovation resistance propositions.[26] Quantitative information on demographic characteristics and use of computer and online database technologies was also collected.

FINDINGS

Sixteen state school faculty members and an equal number at the private school were interviewed in early 1993. The subjects were assured that their identity would remain confidential.

Quantitative Data

Although the study was primarily concerned with gathering qualitative data, some quantitative data was collected. This information was used to compare personal characteristics of the professors at the two schools and to measure the extent of computers and computer communication adoption.

Characteristics of the Interview Subjects. The interview subjects at the two schools were selected so that their demographic makeup and teaching subject areas matched as best possible. Fourteen male and two female professors were interviewed at the state school. Twelve male and four female faculty were questioned at the private school. This distribution of gender is statistically no different from chance (Chi square = .821, df = 1, p = .365). The average ages of the two groups were 52.8 years for the state school and 52.0 for the private, which is virtually identical (Chi square = .200, df = 30, p = .8427).

The state school professors said they taught in the following areas: six in advertising, three in broadcast journalism and seven in print journalism. At the private school, the following distribution was obtained: three in advertising, five in broadcast journalism, and eight in print journalism. These differences were not statistically significant.[27]

Computer Use. All but one of the faculty at both schools reported having a personal computer in their office and at home. This yields a computer adoption rate of 96.9 percent for the two institutions. The amount of computer usage between the two groups was nearly identical, with only one professor claiming to be a non-user. Three usage level categories of "heavy," "light" and "never" were devised. At both schools, five professors were heavy users and approximately twice that number were light users. The differences in usage levels between the two institutions were not statistically significant. (Chi square = .0151, df = 1, p > .0001)

Both schools had begun their educational subscription to the Lexis/Nexis service at about the same time, about eighteen months before this study was conducted. Use of the Lexis/Nexis service, however, was markedly different between the two schools, as Table 1 shows. Two-thirds of the state school professors were categorized as non-users, while the opposite was the found at the private school. This difference was statistically significant below the .10 level.

Table 1 About Here

The use of electronic mail by faculty at the two schools was similar, as revealed in Table 2. A minority of the professors at either school used email regularly.

Table 2 About Here

Qualitative Data

The results are presented under four themes: personal computer experience, Lexis/Nexis experience, electronic mail experience, and information sources.

Personal computer experience. The subjects were asked about their experiences with the adoption of personal computers to investigate possible effects of previous innovative experience. Furthermore, computer communications are assumed to be an innovation that is continuous to personal computers.

One professor described his experience with adopting a personal computer as

> . . . fairly easy. I learned the word processor in probably less than a week. I felt I had it mastered in less than a week.

For others, the process was more difficult and took quite a bit more time.

> . . . they first brought this thing in here about three or four years ago but I didn't have a printer so it just sat up there for a year. And think I think, hell, it took me damn near six months before I e ver could. . . the thing intimidated me, I had a hell of a time getting comfortable with it. But I couldn't do without it now.

A broadcast journalism professor recounted a similar story about his first experience with a personal computer.

> The first week was deadly. Totally deadly. I contemplated getting rid of the damned thing. But then suddenly . . . I know it's a proverbial "light goes on" thing. And a light went on. And everything I never thought I could possibly memorize became rote. And I couldn't even write now without one.

One professor likened his introduction to personal computers to

> . . . a young man's first sexual experience. I mean, it's something you look forward to, but it's not quite as good as you thought it might be.

A former newspaper reporter discussed his experience in terms that could be related to the concept of continuousness as found in Ram's model.

> I've always recognized the computer as essentially a tool, rather than an end to itself. And so it was no more traumatic than when I went from a manual typewriter to an electric typewriter to a computer.

Yet for others, the adoption of personal computers while in the industry was difficult.

> I went through the excruciating, blood-curdling, mind numbing, appallingly excruciating experience of having to learn this goddamned thing. And it took a part of my life that has never been replaced! I may be exaggerating slightly, but you can imagine what it took to finally learn this darn thing. I had to learn on the job. After about four or five weeks, finally I caught on enough where I was comfortable enough to work with it on my own.

One professor said that even though he did not use them personally, he was, however, the beneficiary of a great deal of computer usage. A family member used a home computer to type up the professor's hand-written manuscripts, and his research assistants used computers for a vast amount of statistical work. This professor summed up his thoughts on computers:

> They're tools that other people use. I like what they produce, but I haven't the faintest interest in knowing how they do it. They produce the goods, that's all I know.

Several subjects offered their general feelings about the diffusion of personal computers.

> It's become a necessity now, so it's almost academic to debate whether it's a blessing or not. It's here, you've got to use it. It's the way things are, we have no choice. That's like saying, "do you think automobiles are a necessary evil or beneficial?" What difference does it make, you have to drive a car. Same with a computer, you don't have a choice in the matter. It's a natural outgrowth of modern society.

> What is of interest to me is how I can use something, a tool. It's the same as a hammer to me. Now that may be short-sighted on my part, but my only interest in it is how I can use this tool. If this was a hammer sitting there, and I needed to drive a nail, that'd be fine.

Lexis/Nexis experience. The interview subjects who were users of Lexis/Nexis were asked whether their experience with learning the system was easy or difficult. This was an attempt to address complexity and other related factors.

> . . . the first thing was, "gee, this may be more difficult than I think," and then secondly, a feeling of, "hey, I know this has got some good stuff, let's go see." So, a little mix of apprehension, a little like opening a Christmas present. Once I got into it I found out how easy it was to use.

I found it very easy to learn. Although I am well aware that I probably could be using it more efficiently. I think there's a tremendous amount of waste going on. I don't mean me! I think I'm pretty cautious. But, I know how much more precise I could be.

I would say it's somewhere in between. We have instruction manuals, and the one we have right now seems to be a fairly well-written instruction manual. But I can see how someone who goes in cold, with whatever manuals that they generally provide, might have a little trouble. I would rank it somewhere in the middle. I mean, if you've got a scale from one to three, one being easy, three difficult, I'd say it's about a two. I mean, it's not all that difficult and yet, there are some things that you have to think about and try to figure out for yourself.

The subjects were asked about their general impressions of the service. Those that reported using the system regularly said it was easy to use and that their overall opinions were positive.

I thought it was like having a bookstore in your house. It was like, unbelievable. I still think it's the greatest luxury in the world, it's like having 20 encyclopedias in your computer.

It's a remarkable experience because without going to the libraries and poring through indexes and card catalogs and stacks and stacks of shelves you can get it. It takes a bit of time to catch the real feel for it and to know what the alternatives might be. [But] once you've caught on to the knack of identifying the access codes [search words] then all this comes out on the screen and the printout immediately.

Some said that while they were favorable towards Lexis/Nexis, their own lack of abilities caused them to feel some frustration.

Great pleasure in it. Except I'm also frustrated. Typical of me with computers, maybe it's like this with everybody. You learn a certain little bit of thing, you know there's so much more there and I just seem to get at it, what all I want to do.

Two professors said that while they generally found Lexis/Nexis easy to use and had favorable beliefs about it, they did find some fault with some aspects of its operation.

Easy to use, although it's a slow system. It doesn't have menus, for example. And so you have to go through a series of things to be able to do it. Like, for example, if I log on and all I want to use is the Nexis news database, I've got to go through several levels of that, and you have to wait.

What I've found bothersome is that it does not try to work closely enough with natural language instincts. That is simply a matter of programming, that Lexis/Nexis could be made more user friendly.

One professor stated that the content of Lexis/Nexis databases was not well suited to the type of research he did.

> I don't really find that it offers me the kind of material, that as a historical researcher, that I really need. It's too topical currently and there's very little retrogressive stuff in it.

The users were also asked whether they ever felt emotions of a negative nature, such as apprehension, nervousness or embarrassment, when using Lexis/Nexis. This question sought to explore the subjects' perception of risk resulting from using the innovation. Few subjects responded that they believed there was anything that could bring on these feelings about Lexis/Nexis. A broadcast journalism professor remarked that he was "too old for that. I'm never afraid of making mistakes."

One print journalism professor raised a concern about privacy.

> I guess . . . the only silly thing is, you might think there's someone out there monitoring your searches, and want to know why you're doing some really dumb searches, or very personal searches or stuff like that.

Several subjects said that gaining access to the system was a source of difficulty that they found frustrating.

> I'm not always comfortable with it, to be honest. Sometimes you just can't get online. So that is the biggest frustrating thing. Once you get on it's a puzzle and it's fun. The other thing is, printing can sometimes be difficult. There's certainly nothing that makes me nervous about doing the searches. It's just the mechanics. Did I get logged on? Now I've gotten cut off, I can't get my password entered. It's the frustrations of the mechanics, that's the only thing.

> If I can't get in on any of the codes [passwords] that's frustrating. That doesn't usually happen. We also have some problem that, I will go in on a number that somebody else has been using earlier in the day, and they haven't signed off in such a way as to eliminate their whatever. And the next thing I know, I'm getting their thing printing out before it gets to mine, and I have no way of knowing how long their's was.

An advertising professor said any negative feelings about the service were directed toward himself, rather than the system.

> It's more the frustration of myself not knowing how to use it well and saving time with it. Right now it could be very painful and take a long time to find what I'm looking for.

The subjects that had not adopted were asked to indicate for what reasons they were not users. Although he was a proponent of computer communication, one professor did not use it himself because he believed it entailed some risk.

I'm not interested in being in a computer network because I might get a virus and I don't want a virus and I don't want to have to deal with all this other stuff. I only want to do what I want to do. I'm interested in the theoretical side of it rather than tinkering with my computer.

The majority of the non-user subjects that had formed an opinion said they were generally positive about the service. Several professors said that they would like to use the system, but had not adopted it since they would soon be retiring.

I'm familiar with it, and it's a wonderful thing. [But] I'm going to retire at the end of the summer and what I'm doing now I don't have any particular need to use it right now.

Several non-users cited lack of awareness as a reason for not using Lexis/Nexis.

Never heard of it. I sort of know what they do, but I'm not interested in them.

This may be ignorance on my part. I really don't know enough about it. I think if somebody just showed me how to use it.

I know they're using it in the newswriting and reporting classes, and use it quite heavily from what I understand. I've never gone through an orientation session for myself, not having seen a great need for it, so I don't know much about it. The kind of research I've done so far, I haven't had the need to use it.

A few stated that they did not believe they had a need for using it.

Lack of need. If I needed it, I would use it next hour, if necessary. Those who use it seem to react very favorably to it. I haven't heard any negative comments. It's just that I have not, in my work, have not really had a need to use it.
On a given day, I don't need it. I would probably use it if I had direct access to it. Now I would have to go over there to the main building and use it. Whereas if I had access through my computer here, I'd probably use it more often. Right now if I need something my first thought is to go over to the library. I'm sure it could save time if I had direct access to it. But I don't. If I had it, I'd use it, but it's not necessary for me to have to do my job.

Some said they had not adopted because they had assistants that performed such services for them.

To me it would be something that I'd just go over and sit down and learn, I'd use it. But as long as I have a graduate student or some of the others to do it, I don't really have a need.

If I want some information, I'll get someone to get it for me. I don't believe in doing my own research, I tell other people to do it. My time is better spent doing other things.

One common complaint that many individuals cited as preventing them from adopting the technology was a lack of time. Many said that their duties kept them from using the system to the extent they wished.

> I do not have time to sit down and learn all the things the computer can do for me, as much as I would like to. It's like practicing the piano. I will never play well because I can't have the time to sit and practice. Well, that's kind of the way I feel about the computer.

> Time, for one thing. It was a matter of, any time you have to learn something new on the computer, you have to sit down and spend a few hours, or a couple of days, or whatever, getting into it. I just haven't had that much spare time. Everything takes time. I don't have time. What I want to do is just sit and learn it all. I don't have time to do what I do. And it always takes time.

The subjects were asked about any adaptation accompanying the adoption of Lexis/Nexis, and whether adoption brought about any alterations in their work. This was an attempt to elicit experiences of dealing with change that may involve the new technology.

> It's changed my research methodology to some extent. I find that I do more newspaper research now, because it's more accessible, and I do less journal research. I think it's added a dimension to it that it wouldn't otherwise have. I don't think I'm as good with some of the scholarly stuff and I think what it does is it makes my writing more journalistic.

> I have to spend less time in libraries. It's just revolutionized things. I don't have to set aside a day to go to the library. Just set aside an hour and walk down the hall. I'm writing a piece now about the future of television news . . . so, I want to do some background. Before Lexis/Nexis, I would have had to go to the library and probably spend a minimum of 20 to 24 hours trying to research, in a half-assed manner, enough to write this trade piece. Well, I don't have to do that now. I would say that it's so fast and so efficient, I can squeeze in some research between other things. I can hunt for something because it's right at my desk and it's fast and quick and easy, rather than setting time aside for it.

> I suppose I am more thorough. I suppose in the old days after I'd found two or three good sources I would have quit and worked on some other aspect of the research. But here, obviously I'm discovering things and sources that I would probably have not looked at.

Those that were not adopters were asked whether they thought that adopting Lexis/Nexis would bring about changes in their work habits. Most gave no opinion since they felt that they could not offer an evaluation without having used the system. A print journalism professor who was contemplating adoption remarked that he could foresee one deleterious consequence.

> The only thing I see is that you can pull up such a mass of material, that you get maybe caught up in going through lots of material just because it's kind of fun to go

through it, not because it is really something you need or specifically want to look at. It's "gee, all this stuff is available, why not look at it" and "oh, this is interesting, why don't I read it all."

The subjects were asked if there was anything they would change about the Lexis/Nexis service. This line of questioning was devised to probe for the importance of the innovation's amenability to modification. Most said they were satisfied with it and made no suggestions for changes. Of those that did make recommendations, several expressed a need for improved content.

> I was upset that they dropped the "assets" file, it's a real useful journalistic tool.[28] A lot of that is curiosity stuff, but that teaches you what you can do with it and how to use it.

> One thing I would certainly prefer would be to have more publications online. I'd like to see the Wall Street Journal and the Miami Herald, the Chicago Sun-Times. If you put online scholarly journals, I'd love it.

> I wish they had a file for articles on the media, specifically, so I wouldn't have to search around for stuff as much. More specific to my discipline. I don't think they have one like that.

The subjects were asked whether there was anything about themselves they would change in regard to using Lexis/Nexis.

> I think I spend too much time dabbling. And too much time just having fun with it and not enough focused searching. On the other hand, if you hunt around like that, stuff starts to take shape and you can focus in on things and figure out ways that terms might go together.

> Time is the major factor. I probably should spend more time learning it, so that I'm just better at accessing it. I've gotten far enough into it to satisfy my immediate needs. Like being starved and I've got a sandwich in front of me. I'd love to have a full meal, but the sandwich is good enough for now.

> I just don't have the time. I'm time-impoverished. And I would like to learn the system more because I think there's shortcuts. And I don't know all the nuances yet.

The interview subjects were asked how they might characterize users of Lexis/Nexis, and how they might describe those who do not use the service. This was an attempt to reveal something about the social implications of adoption or non-adoption. One print journalism professor described those who were not users of Lexis/Nexis by stating

we have a few people who I think are Neanderthals, but they'll be leaving soon, through retirements and whatnot.

Those who had not adopted were asked what they thought of people who were adopters. Most had no opinion, but a few professors were able to offer some observations.

There's some people around here who are real computer nuts, which is fine. I mean, they know how they work, they love to talk about software and whatever. I've never been that enthralled with hardware or software except for what it can do. I'm interested in what computers will do, what they can do for me.

Electronic mail experience. The subjects were asked about their experience with electronic mail. Most of the professors at both institutions said they were non-users. Only two of the state school faculty and five at the private school were regular users.

I've been using email for about three years, and especially since our long distance phone service has been taken away from us because of budget cuts. So I use email more now for those kind of personal contacts than I did before. Kind of forced into it. But I find it is a very good way of having contact with professionals. A lot of professionals have email.

I find it difficult. I'm one of those people that likes to learn everything about something before I do it. I feel very frustrated in something like email because . . . I want to read the book. And there is no book.

I think it's neat, but I use it rarely. I don't even check it that often. I'm sure I don't know all the nuances, that might be one reason that I don't use it that much.

Those who were non-users of email generally claimed that they knew too little to make any judgment about it.

I don't know a whole lot, other than that it's out there. I've never used it. I wait until I need to do something, then I learn to do it.

I don't use it. Probably procrastination. But I know that its use is growing. And I'm sure that it must be an advantage.

I don't mess with that. I have no interest, certainly no patience or desire. I don't go home and have my dinner and play with my computer. I couldn't care less. I hear people talking about it email, and I just don't know much about it.

Many professors said that they had not found a particular need for adopting email and that there were already established technologies that satisfied their communications needs.

I don't know if I would use it. I think I would rather just pick up the phone. It seems like there's not any good reason to use it.

Pretty much ignored it. I always felt if somebody really wanted me badly enough, they'd call. I saw the reason for it, it was more that I wasn't quite sure how to

access it. Once again, I didn't have enough time. I'm still not quite sure of what it's saving you. Maybe I don't understand what it's all about yet.

One interview subject reported that he needed to adopt the new information technologies one step at a time.

> I know it [email] exists. And when more time goes by and I'm more comfortable with that [computers] I'll be ready to explore email and Gopher, that kind of stuff.[29] But I've got to wait until everything else is in place before I add a new piece to it. When I'm fully comfortable with one thing, then I'll go to the next.

Information sources. Subjects were questioned about how they found out about the availability of Lexis/Nexis at their school, and from what sources they learned about its benefits and how to use the service. At the private school, a part-time staff member was hired to conduct formal Lexis/Nexis training seminars on a regular basis to introduce the system to faculty, as well as to demonstrate the system to students during classes. Several professors and graduate students were mentioned as additional informal sources of information from whom potential adopters could call upon individually for help in learning the system or for advice on its use.

Many of the professors at the private school said that their first experience came through attending the training seminars offered at the school.

> They sent out memos saying "we're getting this now. would you like to learn?" And I went to the training sessions a couple of months back. It was fine. it gave you the basics, told you how to get into it and find what you wanted to find.

Some mentioned having utilized both formal and informal information sources.

> Another professor taught me how to use it. Walked me all the way through it. [Then] there was a time lag from when I used it in the summer and when I used it again . . . so I went to the tutorials. When _____ [Lexis/Nexis trainer] came in, that helped things out tremendously, her handouts, she had some handouts that, no matter how dense you were, and believe me, I'm talking about myself because I'm very mechanically inept, that help a real lot. As a matter of fact, that gave me so much confidence that I introduced it into my undergraduate class, and made the students work with it.

> I had a session in one of my classes. And I've forgotten the name of the woman who . . . she was here from Lexis/Nexis and she taught the session. And I guess the rest I've pretty much done on my own with the help of a couple of little charts here. And [with the help of Professor] _____ once in a while.

One professor received information on the benefits of Lexis/Nexis from one informal source, and lessons on how to use it from another unofficial source.

> I was talking to Professor _____, and he mentioned to me the value of Lexis/Nexis to any researcher. And so, it was with his prompting, that I arranged these two meetings with _____ [graduate student], who then showed me some things that I would need to know in order to make use of Lexis/Nexis.

At the state school, there was no evidence of any formal information dissemination or training seminars beyond the availability of instruction manuals issued by Mead Data Central. One professor was unofficially responsible for matters regarding the service. The state school's few users cited this particular individual as their source for knowledge of the system. Several of the non-users also mentioned this person by name in reference to Lexis/Nexis.

> [Professor] _____ arranged for it to be set up there. I asked him, what kind of password do we need and how do we get into it. I didn't have any trouble getting into it, but I basically ask him questions. If I had any questions I'd ask him.

> I was looking for articles on a particular subject. And I asked him [professor] for suggestions and he said try Lexis/Nexis.

At both schools, the only sources of information on electronic mail were of an informal nature. Both campuses had academic computing centers from which individuals could obtain mainframe accounts and information on email. However, many considered the instructions available for using the mainframe systems to be less than helpful. One advertising professor recounted her experience with the computing center as unfavorable, saying that "the handouts on how to get your account, how to use it and VAX and all that were so confusing." A print journalism professor told a similar story.

> You go over there and they give you this pamphlet and that pamphlet. And I've got all these open all the time and it never seems to affect what I'm trying to do. They show a screen and my screen never looks like that. And I can't do it.

DISCUSSION

The interview responses show a detailed look at the experience of adopting information technologies. The professors' personal testimony provides support for considering resistance an important concept for the investigation of the adoption process. Furthermore, various information sources were found to have significant consequences.

Implications for the Resistance Perspective

Many of the resistance factors described in Ram's model were alluded to by many of the respondents. Innovation characteristics were found to be important factors affecting adoption, as were consumer characteristics. The most often cited reason for adoption of Lexis/Nexis was necessity, which suggests the influence of several combined factors which include relative advantage, realization, compatibility, motivation, and perception. Several of those who were non-adopters declared that they were unaware of what Lexis/Nexis had to offer, or failed to see any need for it. Diffusion of email was found to be at a low level at both schools. Most cited lack of awareness or lack of need for their failure to adopt email.

Complexity of the Lexis/Nexis service, while cited as a potential barrier, was generally not a problem for the respondents. Most adopters said they found learning and using the system to be relatively easy. Complexity, however, was mentioned by some as limiting their adoption of electronic mail. Many found the adoption of a personal computer difficult, but most said that making the next step to using computer communication was not as hard. This suggests the importance of the previous innovative experience and continuousness factors.

The Role of Information Sources

Despite the demographic similarities of the two groups and an almost-universal level of computer literacy, the extent of Lexis/Nexis adoption was quite different. However, email adoption was equally low at both schools.

A major distinction between the two schools was the difference in the characteristics of propagation mechanisms, or sources of information about the innovations. At the private school, both formal and informal sources existed for finding out about the benefits of using Lexis/Nexis and for learning how to use the technology.

At the state school, the subjects said that only informal sources for Lexis/Nexis information were available. Although some official channels of information about email existed somewhere on both campuses, most individuals at both schools reported that the information they needed before they could adopt the technology was obtainable only from informal sources.

The results show that information sources may have significant effect on resistance to the adoption of innovations. This is consistent with the findings of many adoption studies, beginning with that of Ryan and Gross.[30] The subjects at the private school stated that they had a combination of formal and informal sources from which to receive information on such issues as the benefits of Lexis/Nexis. However, the state school professors said that only informal sources were available. Twice as many private school professors had adopted Lexis/Nexis than did those at the state school. Many at the state school who were non-adopters said they knew too little about Lexis/Nexis to form an opinion or claimed that they failed to see a need for it.

At both schools, only informal sources for electronic mail information were identified. The number of professors who said they were regular users of email was equally low at the two institutions. The non-adopting subjects reported that they were only slightly aware of electronic mail's existence and said they saw little need for adopting the technology.

The results suggest that lower resistance to complex technological innovations, with concurrently increased adoption, is facilitated by both formal and informal sources of information. Formal sources, such as advertising, stories in the mass media, or information from representatives of the organization responsible for implementing the innovation (also known as change agents), may be important for widely disseminating information about the benefits of an innovation. Formal sources make it possible for a number of individuals to receive information on which they can base beliefs about the necessity of the innovation. Informal sources may then serve to further lower resistance to adoption among those who believe they need the innovation. This assistance may take the form of discussion about personal experiences with the innovation or even one-on-one tutoring on its use.

Informal Information Source Roles

Interpersonal information sources were found to take several forms. One such role can be called that of a facilitator. This type of individual acted as a guide or tutor instructing the potential adopter on the use of the system, and discussed benefits they may have accrued from the

innovation. The role of the facilitator may be found to grow in importance as the complexity of the technological innovation increases.

Another role can be identified as being an enabler. An enabler may prevent another individual from adopting by using the innovation instead of him or her. The individual therefore gains the benefits of the innovation without actually having to adopt it personally. This can be a deleterious relationship, as the non-adopter can become dependent on the enabler, have his or her information filtered by that person, or otherwise lose some power to the enabler. This was the case with a few faculty members who claimed that they relied on graduate assistants to either use Lexis/Nexis for their research needs or had them lecture classes on its use.

Two roles were less evident in this study. The first of these can be called the promoter, an individual who merely offers a positive assessment of the innovation, but without personal instruction. It is possible that there could also be dissuaders who offer negative assessments of an innovation. These roles may assume greater importance depending on the type of innovation involved.

Additional roles may be present within an organization. The nature of these roles is likely to depend on the type of innovation involved, the characteristics of the organization, the level of choice over adoption, and other factors.

Level of Adoption

The classification scheme most widely used in research on adopters generally describes the results of the adoption process in terms of "innovativeness," using such labels as "innovators" or "laggards." This categorization of adopters according to time of adoption yields a somewhat limited description of the process. This typology describes the adoption process as a question of "when" but fails to address the equally important question of "why." This failure to consider the qualitative nature of the adoption experience may be a result of pro-innovation bias. Some individuals may be early adopters of an innovation despite high levels of resistance. These adopters may see the innovation as a "necessary evil." Additionally, a "laggard" may be enthusiastic about the innovation despite late adoption. Also, those who resist adoption need not

be classified in a pejorative fashion merely because they fail to adopt a particular innovation. Some innovations have deserved rejection, as many former Edsel owners will attest.

Heavy users of computers and computer communications were found to be promoters or advocates of computers. Light users were less likely to use either technology and some referred to computers as being merely "tools." These individuals seem to have made an accommodation with the technology they need to function in their work. Finally, a few did not use computers for any reason. Some respondents referred to such non-users as "Neanderthals" who were likely to wear "green eye-shades." These individuals are those that seem to avoid new technologies.

The qualitative nature of the adoption behavior found in this study suggests a three-level typology of adopters consisting of (1) advocates of innovation, (2) accommodators of innovation, and (3) avoiders of innovation. This typology describes individuals within the adoption process in terms of the qualitative nature of their adoption, rather than merely by their relative time of adoption.

Advocates of innovation are individuals who are "cheerleaders" for an innovation, adopting early and with great enthusiasm. The rewards to the advocate may lie in perpetuation of their beliefs through the adoption of similar beliefs by others. Advocates may be influential if they hold an "opinion leadership" role within the social group and have a certain level of credibility. Some advocates of innovation, however, may be looked upon by potential adopters as lacking in credibility and may, in fact, increase resistance by alienating others with their technological proselytizing.[31] Advocates are categorized as those respondents who have positive beliefs about computer communications, are heavy and regular users and believe that others should be as enthusiastic as they are about such innovations.

Accommodators of innovation are those who pragmatically adopt an innovation as necessary for a variety of reasons, but do not adopt simply because of any desire to innovate for the sake of innovativeness. In other words, accommodators can be designated as those who have somewhat negative or weakly positive beliefs about adoption but are nevertheless users of the innovation.

Avoiders of innovation are identified as those that exhibit resistance to innovation and refuse to adopt long after many new innovations have become widely accepted. They may be regarded by their more enthusiastic colleagues as the "Underwood typewriter crowd." These respondents are more likely to hold strong negative beliefs about the innovation.

CONCLUSIONS

This study clearly shows that the resistance perspective makes a significant contribution to the theoretical understanding of innovation adoption, a process that is more complex than previously suggested. Resistance may provide a valuable framework for predicting why some innovations are adopted more slowly than expected. This concept may also be extended to further develop theory on the adoption and rejection of innovations on a societal level. Greater understanding of how adoption takes place will be of growing importance as new communication technology becomes more crucial to industry, education, and ultimately society.

Table 1

LEXIS/NEXIS USAGE

	State		Private		Totals	
	N	Percent	N	Percent	N	Percent
Users	6	37.5	11	68.8	17	53.1
Non-users	10	62.5	5	31.2	15	46.9
Totals	16	100.0	16	100.0	32	100.0

Chi square = 3.137 df = 1 p = .077

Table 2

EMAIL USAGE

	State		Private		Totals	
	N	Percent	N	Percent	N	Percent
Users	4	25.0	5	31.2	9	28.1
Non-users	12	75.0	11	68.8	23	71.9
Totals	16	100.0	16	100.0	32	100.0

Chi square = .155 df = 1 p = .694

NOTES AND REFERENCES

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16 S. Ram, "Marketing Strategies to Reduce Innovation Resistance: A Laboratory Experiment" (Ph.D. diss., University of Illinois, 1985), 43.

17 S. Ram, "A Model of Innovation Resistance," Advances in Consumer Research 14 (1987): 209-212.

18 Rogers, Diffusion, 3rd ed., 15-16.

19 Ibid., 36-38.

20 Ram, "A Model of Innovation," 211.

21 Thomas S. Robertson, Innovative Behavior and Communication (New York: Holt, Rinehart and Winston, Inc., 1971), 80. Ryan and Gross found that the influence of salesmen was more important in the spread of information, while discussion with neighboring farmers was more important in the decision to adopt new corn seed. Bryce Ryan and Neal C. Gross, "The Diffusion of Hybrid Seed Corn in Two Iowa Communities," Rural Sociology 8 (1943): 24.

22 Other innovations included male oral contraceptive pills, see-through jeans, 3-D color film, low-calorie white wine, freeze-dried beer concentrate, a portable computer, and a self-correcting word processor. Ram, "Marketing Strategies," Appendix 1, 122.

23 In June 1993, this discounted rate was $300 per month for the unlimited use of three passwords. In comparison, the non-discounted rate is much higher. Lexis/Nexis charges a $50 per month subscription price, a $33 per hour connect rate, a per search charge between $6 to $50, and display charges of $.025 per line. Under this pricing structure, a ten minute search at the full rate results in average cost of $13.70. Mick O'Leary, "NEXIS Positions for the 90's," Online Access, Spring 1993, 36-38. One newspaper, USA Today, was paying up to $18,000 per month for Lexis/Nexis before it changed to a less expensive service. Kathryn McCabe, "The Fortune 500 Online," Online Access, Spring 1993, 33.

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25 J. T. Johnson, "The Unconscious Fraud of Journalism Education," Quill June 1992, 33; Margaret H. DeFleur and Lucinda Davenport, "Computer-Assisted Journalism in Newsrooms vs. Classrooms: A Study in Innovation Lag," Journalism Educator 49 (Summer 1993).

26 The questions were devised according to guidelines in Floyd Fowler, Jr. and Thomas W. Mangione, Standardized Survey Interviewing (Newbury Park, CA: Sage Publications, Inc., 1990), 77-94.

27 Although there were several cells with values less than five, which raises doubts about the validity of the chi square statistic, further collapsing the table by combining the two journalism cells failed to substantially increase the chi square value (chi square= 1.39, df = 1, $p > .20$).

28 Until January 1993, under the educational discount contract, Lexis/Nexis allowed the use of a database service called "Assets" that offered information on personal property tax records.

29 Gopher is a mainframe information discovery and retrieval software package that simplifies access to Internet information resources through the use of a menu system. Tracy Laquey, The Internet Companion (Reading, Mass.: Addison-Wesley Publishing Company, 1993), 106.

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31 Barnett suggests a similar notion. Barnett, Innovation, 381-401.