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Predictors of support for doctoral programs in media information technologies

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Abstract

This study assesses interest in curricular development in new technologies among communication faculty, with a focus on doctoral-level programs. Diffusion of innovations theory explains both individual- and organizational-level factors that may account for adoption of innovations, including those stemming from new technologies. In the field of communication, media information technology programs represent an organizational-level innovation of clear importance but with uncertain faculty support, due to individual factors (e.g., interest area, age) and departmental constraints (e.g., lack of resources). In light of this, several research questions are advanced to address: (1) the current level of support for media information technology programs among communication faculty members and (2) predictors of faculty interest in having more media information technology programs. Data were collected through a random sample of faculty members who filled out a survey on the World Wide Web. Results indicate that media information technology programs are viewed by faculty as the most needed type of program in the field of communication. Findings from a logistic regression analysis also reveal several predictors of support for new technology programs, including male gender, support for organizational communication programs, support for programs focusing on mass communication, and the belief that multimedia teaching facilities are important. The implications of these findings are discussed, with an emphasis on their relevance to faculty working in communication and related fields.

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1. Introduction

The new millennium finds interest among administrators and educators in the potential for academic technologies such as distance learning, CD- and DVD-ROM, and web-based instruction (e.g., Nicholas, 2004). Perhaps no field is poised to make greater use of these emerging technologies—and be transformed by them—than communication (e.g., Craig and Carlone, 1998). Yet, despite the existence of a large body of literature focusing on technology and innovation adoption (Rogers, 2003), scholars are only beginning to track the growth of information technologies as a viable area of study within communication education.

Champions of scholarly inquiry in the domain of new communication technologies such as Rogers (2003) maintain that the ongoing convergence of computers, telephones and television media represents an unprecedented ferment in the field and larger economy. This ferment in communication industries is unleashing a new "I.C.E." age, an acronym that Pelton (2003) uses to describe the $4 trillion colossus based on merging Information, Communication and Entertainment industries. Without an appreciation of the requisite skills in "being digital"—which include encoding, decoding and storage of electronic messages—there would be no media, and no "new economy" (e.g., Bell, 1976).

To help guide this economic development, several recent appeals have been made to enhance the study of media information technologies. The National Science Foundation (NSF), for example, identifies *cyberinfrastructure* as one of five priority investment areas for 2006. This developing technological infrastructure is expected to spur advances in all areas of science and profoundly affect individuals, who are increasingly becoming a part of the "integrated communication grid" (Dizard, 2000). To advance its goals, the NSF plans to allocate millions of dollars for the funding of cyberinfrastructure research in the areas of social, behavioral, and economic science ("NSF 2006 Budget Request").

Such initiatives help document the *raison d'etre* of communication to our emerging information economy (Berko et al., 1994), which can in turn help fend off attacks on the discipline from established members of the academy (e.g., Atkin, 1996; Atwater, 1993). Increased emphasis on media information technology, as a curricular innovation, would offer sizable benefits for the field of communication, practitioners, academic institutions, students, and faculty members. This study is designed to assess interest in doctoral-level curricular development in new technologies among communication faculty, using diffusion theory as a guide.

2. Diffusion theory and predictors of program adoption

In the latest edition of his seminal work, Rogers (2003) defines *diffusion* as the process of communicating innovations through certain channels among members of a social system over time. Importantly, Rogers moves beyond the traditional realm of new product adoption to address acceptance of ideas (and, in this context, pedagogical foci), defining an innovation as:

> "an idea, practice or object that is perceived as new by an individual or other unit of adoption. It matters little, so far as human behavior is concerned, whether or not an idea is 'objectively' new as measured by the lapse of time since its first use or discovery. The perceived newness of the idea for the individual determines his or her reaction to it" (Rogers, 2003, p. 12).

Despite the compelling need for updated study of emerging communication technologies, commentators (e.g., Zurovchak, 1999; Lin and Atkin, 2002) lament the slowness with which the scholarly community—whose job it is to chronicle the evolution and influence of such trends—moves when updating its curricular offerings. However, some scholars may be more receptive than others, and diffusion theory provides a useful framework for predicting how likely individuals are to accept innovations such as new pedagogical foci on emerging communication technologies.

Communication faculty members possess several demographic characteristics that make them especially likely to be receptive to new ideas. With regard to the individual-level adoption process, social locators are typically important predictors of likelihood of adoption. As reviews by Rogers (2003) and Dutton et al. (1987a,b) suggest, diffusion studies find a fairly consistent positive relationship between early adoption (i.e., of a curricular change) and education and higher status occupations (e.g., Adcock et al., 1977; Neuendorf et al., 1998; Robertson, 1971). Educational attainment is linked to a higher need to process and understand information technologies. This was traditionally perceived as a daunting barrier to the adoption of computer services, but has recently been ameliorated by the drive to provide more user-friendly systems (Zurovchak, 1999). Related to these attributes, higher occupational status can drive adoption owing to a professional's greater work-related need to be informed.

As Rogers' (2003) review suggests, adoption studies often yield conflicting results with respect to age. Although the confluence of research suggests that older individuals are relatively slow to adopt, younger consumers are typically only able to adopt low-cost innovations. In the realm of interactive media, for instance, younger consumers are among the most receptive for low cost, high technology products such as automatic teller machines (Adcock et al., 1977; Lin and Atkin, 2002). Given that the median age of Internet adopters is 38, and that of the average faculty member is about 10 years older (Neuendorf et al., 2001), age-related dynamics do not bode well for professorate adoption of computer applications, which may extend to technology-based doctoral programs. In fact, generational technology adoption dynamics suggest that faculty face a deficit in computer skills, relative to their students (e.g., Beniger, 1996; Zurovchak, 1999).

In addition to a consideration of the roles of individual characteristics, dynamics of the *collective* decision-making process are also important. Curricular adoption is typically a collective decision at the end of a consensus-building process. To the extent that the collective (e.g., an academic department) holds characteristics associated with lower organizational innovativeness in general (Rogers, 2003), the unit may be expected to resist *all* changes as threats to the integrity of the collective body. Academic units are likely to be high in factors such as complexity and interconnectedness but low in centralization, all of which are positive contributors to greater organizational innovativeness. On the other hand, they tend to be high in formalization (i.e., many rules and procedures) and lacking in organizational slack (i.e., short on available resources). These two factors are likely to inhibit change. Particularly, in the case of low organizational slack, dynamics

of *competition* for resources may emerge. If this happens, the academic unit (e.g., a communication department) may resist adopting a new technology curricula based, for example, on the perception that such a program requires too much time, monetary investment or technical knowledge to implement. Or, certain sub-units may perceive the new program as something that will take away resources from their areas. These types of thinking would limit potential support for new technology programs, despite an economy in which such programs would surely thrive.

3. Research questions

The importance of technology programs seems clear, in light of the current information economy, and this should be evident to most communication scholars. Faculty also have several characteristics (e.g., high education) that match those of individuals who support new technology initiatives. However, some characteristics (e.g., age) may limit their acceptance of new media technologies. In addition, faculty face organizational pressures and constraints that can stifle support for such programs, even when such approval would otherwise exist. The present study addresses these points by examining faculty support for new doctoral programs in media information technologies. We pose the following research questions:

Research Question Set 1: What is the relative level of support among communication academics for new doctoral programs in media information technologies? Does interest in such programs outstrip support for growth in other communication subfields?

Research Question Set 2: What factors predict faculty support for new doctoral programs in media information technologies? Do traditional, individual-level predictors of innovativeness come into play? Is a ''competition'' function apparent, such that subfields are more or less likely to evince support?

4. Methods

Study data were collected through the use of a survey posted on the World Wide Web.[3] The population chosen for this study was faculty members from US universities who belong to at least one of three major communication organizations (Association for Education in Journalism & Mass Communication [AEJMC], International Communication Association [ICA] and National Communication Association [NCA]). The sampling frame was the set of organization membership directories. Using a systematic random sampling method, equal proportions of names and e-mail addresses were selected from each of the three directories. Names that did not have an e-mail address were ruled ineligible and substitutes were randomly chosen. And, names of individuals who reside outside the US, who are not affiliated with a college or university—or whose primary position is that of an administrator—were ruled ineligible and substitutes were randomly chosen.

A total of 1264 faculty members were selected for inclusion in the sample. The e-mail addresses of individuals selected via the sampling procedure were used to invite participation in the survey. E-mail messages were written with the header ''Help evaluate doctoral

[3] Two identical surveys were posted, one for faculty and one for chairs. Also, other measures were collected with these instruments, in addition to the ones reported in this paper. However, only the faculty study results and the measures pertaining to the research questions posed in this paper are reported here.

programs". The text of the messages included information about the survey and how it could be accessed. The e-mail invitations were sent using the BCC (blind carbon copy) function in Eudora. Approximately 350 of the invitations did not reach their intended targets, however, due to address changes and/or human error.

Included in the survey was a variety of social locator measures tailored to the academic sample: age, gender, highest degree, academic rank, and teaching specialties/research areas of interest, plus name of department/university and degrees offered by that unit (i.e., B.A., M.A., etc.). Since several of these variables were nominal (i.e., open-ended), they were dummy coded after being collected so they could be used in later analyses. Specifically, the highest degree, academic rank, and teaching/research interest variables were dummy coded, with a "1" indicating presence and "0" indicating absence of the item. In the case of the teaching and research interest variables, dummy coding was especially important because some faculty members identified several areas of interest, such as mass communication, political communication, and rhetoric. These types of responses were coded according to the categories presented in Table 2, so that each faculty member could have up to 17 teaching interests and 17 research interests.

The survey instrument contained one section asking respondents to rate how important certain qualities (e.g., reputation of the university, student involvement in faculty research) are in advising students interested in obtaining a doctorate in communication (see Table 1). This section used an 11-point (0 = not at all important; 10 = very important) scale to tap the importance of each item. Also included in the instrument was a section asking respondents to indicate whether there are not enough, just the right amount, or too many doctoral programs that emphasize each of 17 areas of communication (see Table 2). These items were also dummy coded after the data were collected so that "1" indicated not enough programs and "0" indicated the right amount or too many programs with the particular emphasis, or that the respondent did not know.

5. Results

A total of 221 faculty members responded to the survey. The sample was 39.7% female, with a mean age of 45.48 years. A majority of respondents had a Ph.D. degree (89%) and were either Assistant (26.2%), Associate (40.2%), or Full Professors (29%).

Table 1 presents the descriptive results of respondent ratings for a wide array of criteria applied to doctoral programs in the field of communication, when considering advising a student interested in doctoral studies. In the questionnaire and in this table, the criteria were split into general factors and curriculum-specific factors. As assessed by the faculty sample, when advising a student on doctoral programs, the top general criteria were the quality of the university library, up-to-date computer facilities, student attendance at academic conferences, the national research reputation of the faculty, and faculty encouragement of students to explore diverse perspectives on communication research.

With regard to curricular factors, the faculty ratings resulted in these top criteria for programs they recommend to students: coursework in a broad range of theoretical perspectives, quantitative methods coursework, methods courses that are taught within the Ph.D.-granting department or school, the quality of course offerings outside the Ph.D.-granting department or school, and qualitative methods coursework.

In response to the first set of RQs, Table 2 presents the results for the items in the questionnaire that probed perceptions of various disciplinary divisions and specialties in

Table 1
Evaluations of qualities of Ph.D. programs

	Average rating by faculty
How important is each of the following for a Ph.D. program in communication? (0 = not at all important; 10 = very important)	
1. The quality of the university library	9.00
2. Up-to-date computer facilities	8.52
3. Student attendance at academic conferences	8.51
4. National research reputation of communication faculty	8.34
5. Faculty encouragement of students to explore diverse perspectives on communication research	8.33
6. Student involvement in faculty research	8.28
7. The breadth of the communication faculty's theoretic and/or methodological orientations	8.24
8. Commitment of professors to teaching	8.17
9. Student sole authorship on papers/publications	8.10
10. Opportunities for students to teach undergraduate courses	7.93
11. Student co-authorship with faculty on papers/publications	7.86
12. Reputation of the university	7.84
13. A communication faculty that regularly obtains research grants	7.00
14. Multimedia teaching facilities	6.55
15. International research reputation of communication faculty	6.30
16. A survey research lab	6.23
17. Opportunities for students to apply research to non-academic issues	5.99
18. Opportunities for students to learn organizational communication technologies (e.g., tele-, video-, computer-conferencing, virtual teams and decision making)	5.79
19. Experimental research labs	5.74
20. A communication faculty with professional (i.e., non-academic) experience	5.72
21. A video/audio production facility	5.10
22. Opportunities for student internships	4.98
23. The university's proximity to a major metropolitan area	4.97
24. A communication faculty that regularly engages in non-academic consulting	4.36
25. A film production facility	3.47
How important is each of the following to the curriculum of a doctoral program? (0 = not at all important; 10 = very important)	
1. Coursework in a broad range of theoretical perspectives	8.63
2. Quantitative methods coursework	8.46
3. Methods courses taught within the Ph.D.-granting department or school	8.10
4. The quality of course offerings outside the Ph.D.-granting department or school	8.04
5. Qualitative methods coursework	7.93
6. Required comprehensive exams or project	7.72
7. The breadth of course offerings outside the Ph.D.-granting department or school	7.67
8. Required preliminary or qualifying exams	6.59
9. Critical/cultural studies coursework	6.45
10. Coursework on the economics and law of communication industries	5.73
11. Rhetoric coursework	5.45

doctoral programs. The specialty that emerged with the most support was Media Information Technologies. More than half of the faculty respondents (53%), in fact, indicated that there are "not enough" programs in Media Information Technologies. Other specialties for which a sizeable number of respondents felt that there are "not enough" programs include Applied Communication Research (35%), Organizational Communication

Table 2
Perceptions of adequacy of number of doctoral programs

Opinion on number of doctoral programs that emphasize	Faculty sample			
	Not enough	Just right	Too many	DK
Media information technologies (e.g., study of emerging communication technologies)	53	19	7	21
Applied communication research (e.g., using communication principles for problem-solving)	35	23	9	34
Organizational communication technology (inc. tele-, video-, computer conferencing, virtual teams and decision making)	32	14	10	44
Dispute resolution (including mediation and conflict)	28	19	4	49
Health communication (including communication about health issues and within a health context)	27	30	9	34
International/development communication (e.g., communication for national development)	23	23	12	41
Political communication (e.g., study of the role of political messages)	23	33	17	27
Instructional communication (including communication about education and within educational contexts)	21	24	15	41
Promotional communication (e.g., study of advocacy communication, including public relations and advertising)	20	20	27	33
Communication law and policy (e.g., study of the operation of mass media industries)	20	34	10	37
Organizational communication	17	39	19	26
Applied organizational communication (e.g., focus on consulting applications of organizational communication principles)	17	21	11	51
"General" Ph.D. in communication (without a required specialization)	13	26	37	24
Rhetoric (including argumentation, study of freedom of speech issues, analysis of messages)	13	30	30	28
Mass communication	11	44	31	15
Relational communication (e.g., study of interaction in human relationships)	10	31	23	36
Interpersonal communication	6	37	34	23

All figures are percentages.

Technology (32%), Dispute Resolution (28%), Health Communication (27%), and International/Development Communication (23%).

Another way to examine the data in the table is to look at specialties that garnered a substantial number of votes indicating that there are "too many" such programs at present. Such emphases included Interpersonal Communication (34%), Mass Communication (31%), Rhetoric (30%), Promotional Communication (27%), and Relational Communication (23%).

To address the second set of RQs, Table 3 presents the results of a stepwise logistic regression with support for more doctoral programs in media information technologies as the dummy-coded dependent variable (1 = not enough; 0 = just right/too many/do not know). The independent variables, entered into the equation in a hierarchical model with forward stepwise order using the Wald method within blocks, included social locators (age, gender, academic rank) in Block 1, teaching and research interest areas (dummy coded) in Block 2, perceptions of the adequacy of the number of doctoral programs in

Table 3
Stepwise logistic regression results predicting support for more doctoral programs in media information technology

Overall model fit: goodness-of-Fft measures			Value			Significance
Goodness-of-fit			70.337			<0.0001
−2 log likelihood (−2LL)			180.44			
"Pseudo" R^2			0.280			
Cox and Snell R^2			0.322			
Nagelkerke R^2			0.429			
	χ^2		df			Significance
Hosmer and Lemeshow	7.98		8			0.435
Variables in the equation	*B*	S.E.	Wald	Sig.	*r*	Exp(*B*)
Gender (femaleness)	−0.605	0.391	2.401	0.121	−0.109	0.546
Org. tech. teaching interest	2.404	1.142	4.429	0.035	0.132	11.071
Mass com. research interest	1.192	0.405	8.663	0.003	0.166	3.294
Support for more health com programs	0.798	0.435	3.355	0.067	0.150	2.220
Support for more org. com. programs	1.456	0.646	5.084	0.024	0.261	4.287
Support for more org. tech. programs	1.774	0.475	13.961	0.000	0.435	5.894
Multimedia teaching facilities important	0.238	0.086	7.662	0.006	0.185	1.269
Required comp. exam or proj. important	−0.196	0.082	5.745	0.017	−0.136	0.822

Actual group	Group 0	Group 1	Percent correct
Classification matrix			
Group 0: enough or too many media information tech programs	69	19	78.4
Group 1: not enough media information tech programs	21	72	77.4
Overall percentage			77.9

B—logistic coefficient; S.E.—standard error; Wald—Wald statistic; Sig.—significance level; *r*—correlation; Exp(*B*)—exponentiated coefficient.

various types of communication (dummy coded) in Block 3, and evaluations of qualities of Ph.D. programs deemed important in Block 4.

The overall model included eight predictor variables, one from Block 1 (gender), two from Block 2 (teaching interest in organizational communication technology, research interest in mass communication), three from Block 3 (perceived adequacy of number of health communication doctoral programs, perceived adequacy of number of organizational communication doctoral programs, perceived adequacy of number of organizational communication technology doctoral programs), and two from Block 4 (perceived importance of multimedia teaching facilities to a doctoral programs, perceived importance of comprehensive exams or projects to a doctoral program). The model was highly significant, with a goodness-of-fit statistic of 70.337 ($p < 0.0001$), a "pseudo" R^2 of 0.280, and a Nagelkerke R^2 of 0.429. The Hosmer and Lemeshow χ^2 was non-significant, a sign of a strong predictive model. Positive predictors of support for new doctoral programs in media information technologies in the final equation included being male, having an organizational communication technology teaching interest, having a mass communication research interest, supporting more programs in health communication, organizational communication and organizational communication technology, and believing that multimedia teaching facilities are important, but that required exams or projects are not

important, in a doctoral program. The classification matrix revealed a 78% "hit" rate, well above the 0.50 chance criterion. A Press' Q analysis showed a highly significant χ^2 statistic (56.4, $p < 0.0001$), indicating a large improvement over chance.

6. Discussion

This study set out to establish a baseline for areas of faculty demand for academic doctoral programs focusing on communication technology. The present findings help bolster the rationale for enhancing the study of new communication technology. Of the 17 communication areas included in the adequacy assessment section of our survey, the only type that a majority of faculty members thought there should be more of was media information technology programs. This suggests that communication scholars are generally aware of the importance of the emerging information infrastructure and supportive of enhancing its presence at post-secondary levels. The present finding could be used by faculty desiring to establish information technology programs at their institutions. It highlights the strong demand for these programs and shows that the communication field supports research initiatives focused on new communication technologies. To the extent that digital applications assume a central role in our economy, such pedagogy can help identify sources of resistance to innovation.

It is perhaps as instructive to examine what faculty characteristics do *not* predict enthusiasm for the development of media technology doctoral programs as it is to look at those that do. For example, Rogers' (2003) criterion of innovation compatibility would lead us to believe that faculty with specialties in interpersonal communication and rhetoric might be unlikely to support new doctoral programs that would be at odds with their traditional orientations to the field. Yet, teaching and research emphases in these specialties were not significant predictors in this context. And, typical social locators did not emerge as predictive of innovativeness—age and faculty rank were non-significant, and only gender (male gender) was significant. This minor role for social locators is typical of recent research that identifies a growing role for attitudinal predictors of innovativeness (Neuendorf et al., 1998).

Indeed, positive predictors of faculty support for media information technology programs in the present study included several attitudinal variables assessing interest in and support for other, related technological innovations. Specifically, having organizational technology as a teaching focus, being in favor of more organizational communication technology programs, and even the belief that multimedia teaching facilities are important all emerged as significant predictors. This suggests that faculty members who are in favor of media information technology programs are generally supportive of high-tech innovations, across settings and contexts. This may be an indication that some of the traditional divisions between communication subfields (e.g., rhetoric, mass, organizational, interpersonal) may diminish when there is a common interest in new technology. Perhaps having department members who are interested in the study and application of new technology fosters a cooperative organizational climate, which could enhance the prospects for technology-related programs being adopted.

From a practical standpoint, these findings suggest much to faculty members interested in getting new technology initiatives passed. Even if other members of their organization do not have a specific interest in new technologies as part of their program of scholarship, they may still support technology-related programs due to a general interest in some area

or type of technology. It is becoming increasingly difficult to be insulated from technology, and as more faculty members become transformed by these innovations, especially in their teaching and/or research, support should increase. For the present, our results suggest that faculty with an interest in technology would be well-served by seeking out allies in their institution who share some technology interest, even if they do not have an exclusive focus on new media. As the present study findings demonstrate, organizational scholars in particular seem to have an interest in the study of technology. These individuals may be especially willing to become a part of coalitions focused on new technology innovations in the workplace, such as the establishment of doctoral programs in technology.

This general lack of intra-disciplinary competitiveness apparent in the findings may be the legacy of a relatively "plush" position enjoyed by the communication field overall, with a recognition of a growing gap between baccalaureate and doctoral education. Craig and Carlone (1998) have identified a 534% increase in bachelor degrees awarded in all communication subfields from 1968 to 1993, and a 288% increase in Master's degrees. During the same period, the number of doctorates rose only 92%.

In the end, it may be outside competitive pressures that determine the communication discipline's response to pedagogy in new media. For instance, several business schools are developing e-commerce programs (Brin, 1999), hoping to serve a growing market segment that's tripling in size, from $43 billion to $1.3 trillion from 1999 to 2003 (Lin and Atkin, 2002). Education programs are quickly staking out a presence in the growing $250 billion distance learning market (Grimes, 2000).

This study establishes that communication faculty members are largely supportive of new technology programs and offers several predictors of this support. Most interestingly, perhaps, it suggests that an interest in technology may transcend communication contexts, something academic curricula need to respond to. Since the 1990s, the ubiquitous technologies of the "information age" have crystallized attention on high-tech industries, showcasing their vital role in the nation's current and future economy. For instance, Web page design emerged as one of the fastest growing job categories in the economy, as the Web itself grew 1000% during the 1990s. This was also the first decade to see companies spend more on computing and communications—the "capital goods of the new era—than on industrial, mining, farming and construction machines (Lin and Atkin, 2002).

At the same time, reports of jobs in the industry being left unfilled highlight the necessity of having more technology programs in the field of communication to train tomorrow's media professionals and scholars. The present study helps inform our understanding of demand for programs to help students enhance their skills as *strategic communication architects and strategists* in the burgeoning knowledge economy. As Entman (1994) notes:

> The new professionals can help make productive links between information users and computer scientists, engineers, programmers, and designers who are creating the new information systems—connections that are so often frustrating, nettlesome, or absent today (p. 97).

By making these links, new media professionals and scholars can help the discipline of communication enhance its standing in the academic community and, more importantly, generate and diffuse knowledge at a pace reflective of the constant and continual evolution of technology itself.

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