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ABSTRACT

A mail survey of 86 daily college newspapers (91% of the population) measured the adoption rate of digital imaging technology for the routine processing of news photographs to establish the stage of adoption and to assess possible effects of the technology on students' perceptions of newsphoto credibility. Results indicated that 63% reported having published at least one photograph using digital imaging technology and 33% reported using it on a routine basis. Adopters used more new technology in general than non-adopters and printed color photographs more frequently though their average circulation size was similar. Almost 64% of all student photo editors said the technology would eventually decrease the credibility of newsphotos. Editors at adopting papers were even more likely to say this than editors at non-adopting papers. Findings suggest that the adoption of digital imaging technology at daily college student newspapers is occurring at a rate similar to that predicted by Rogers, et al. and that adoption has recently entered the "early majority" stage. (Contains 22 notes, 2 tables, and 1 figure of data.) (Author/RS)

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The Adoption of Digital Imaging Technology at Daily College Student Newspapers and the Credibility of News Photos

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Abstract

A mail survey of 86 daily college newspapers (91% of the population) measured the adoption rate of digital imaging technology for the routine processing of news photographs to establish the stage of adoption and to assess possible effects of the technology on students' perceptions of newsphoto credibility. Sixty three percent reported having published at least one photograph using digital imaging technology and 33 percent reported using it on a routine basis. Adopters used more new technology in general than non-adopters and printed color photographs more frequently though their average circulation size was similar. Almost 64 percent of all student photo editors said the technology would eventually decrease the credibility of newsphotos. Editors at adopting papers were even more likely to say this than editors at non-adopting papers. The study indicates that the adoption of digital imaging technology at daily college student newspapers is occurring at a rate similar to that predicted by the diffusion of innovation approach outlined by Rogers, et al. and that adoption has recently entered the "early majority" stage.

Presented to the Communication Technology and Policy division of the Association for Education in Journalism and Mass Communication for presentation at the annual meeting in Atlanta, August 1994

The Adoption of Digital Imaging Technology at Daily College Student Newspapers and the Credibility of News Photos

Since the turn of the century, a long list of new communication technologies have irreversibly changed the way Americans get their news. Radio, television, and now computer technologies have each dramatically influenced the way news information is delivered, and their widespread adoption has changed the way journalists work and the way audiences interpret the news. But few technologies have challenged the fundamental veracity of news reports as directly as has the adoption of computer-based photographic processing by news organizations.

On several occasions during the last decade, the journalism profession has been shaken by discoveries that prominent publications have "altered reality" by digitally retouching news photographs.[1] Discussions and seminars have been held and guidelines and protocols have been issued in the wake of these transgressions, but the full impact of digital imaging technology on photography and on audience interpretation of photographic news reports is still in a state of flux. Some have suggested that the technology represents the "end of photography as evidence of anything."[2]

This study uses a diffusion of innovation approach to examine the adoption of digital imaging technology at daily college student newspapers and to gauge its effect on student journalists' attitudes about the credibility of news photography. College papers are well suited for such a study because their adoption of the technology is likely to be more gradual than

1 Jean Davidson, "Newspapers' credibility losing focus?" Chicago Tribune, February 20, 1994.

2 Stewart Brand, Kevin Kelly and Jay Kinney, "Digital Retouching: The End of Photography as Evidence of Anything," Whole Earth Review (July 1985): 42-49.

was the case at professional papers and their journalists are less integrated into the professional culture of the newsroom and more likely to exhibit attitudes contrary to the prevailing professional norm.

The adoption of digital imaging technology at professional daily newspapers is essentially complete. It occurred quite rapidly, largely as the result of the wire service decisions.[3] In March 1990, both the Associated Press and United Press International announced that all photo members and subscribers would soon be equipped with a digital imaging computer and that within two years all photo transmissions from either wire service would be digital.[4] The effect of the announcement was to force the transition to the new technology much more rapidly than most had anticipated. By June 1992 all photo subscribers to these two major wire services had electronic darkrooms.[5] This "forced" adoption made a diffusion of innovation study quite problematic.

Few college newspapers subscribe to a photographic wire service, however. Therefore, they have not experienced this forced adoption to the same extent. The adoption process will likely occur over a longer time period and be more amenable to systematic study.[6] Student newspapers are especially appropriate subjects for this study because of the nature of their staffs. College papers inform their communities in much the same way their general circulation counterparts do. But their staffs are only beginning their initiation into the newsroom routines and practices that

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3. Michael L. Morse, "At the Crossroads," *News Photographer* (May 1992): 12.

4 "AP, UPI to Replace Newspapers' Photo Receivers with Electronic Darkroom Systems," *Presstime* (March 1990): 63.

5 See "AP Drops an Electronic Bombshell," *News Inc.* (March 1990): 7, and "All Electronic Photo-Handling Systems Are Not the Same, Users Say," *Presstime* (July 1991): 37.

6 A recent article suggests digital imaging is being adopted at some college student newspapers. See Tom Hubbard, "Good News/Bad News in Teaching Field," *News Photographer*, (March 92): 25,30-31.

form a basis for journalists' understanding of the audience and the news.[7] Attitudes about news and journalism are still being formed by staffers and the effects of technology adoption on their perceptions of news credibility are more likely manifest than may be the case for seasoned professionals. Regardless of whether students are more susceptible to adoption effects, the attitudes and ideas they develop while in college will contribute to their professional development and their understanding of journalism's role in society.

There have been thousands of research reports using the diffusion of innovations approach applied to all manner of innovation.[8] The fundamental temporal pattern associated with the diffusion process approximates an S-shaped (sigmoid) curve when the cumulative level of adoption over time is graphed. The principal effect associated with this curve is the diffusion effect—that as the rate of awareness of an innovation among a population increases, peer pressure begins to develop and the rate of adoption accelerates. This peer pressure is particularly important in social systems that are highly connected.[9]

Rogers also postulates an adoption and innovation life-cycle curve that suggests people or organizations that adopt an innovation at similar times tend to have other similar characteristics. For organizations, key considerations are the extent to which the organization is open to change (risk taking) and the degree to which it perceives itself as an opinion leader

7 See Gaye Tuchman, *Making News: A Study in the Construction of Reality*, (New York: Free Press, 1978), for a discussion of newsroom acculturation

8 Rogers reported 2,297 in his 1983 edition of *Diffusion of Innovations*, and a meta-analysis he and associates published in 1987 examined 11 studies on home computers alone. See Everett M. Rogers, *Diffusion of Innovations*, 3d ed.(New York: Free Press, 1983); and William H. Dutton, Everett M. Rogers and Suk-Ho Jun, Diffusion and Social Impacts of Personal Computers, *Communication Research* 14 (April 1987): 219-50.

9 Everett M. Rogers, *Diffusion of Innovations*,

(social participation). His life-cycle categories are innovators (first 2.5 percent of the population), early adopters (next 13.5 percent), early majority (34 percent), late majority (34 percent), and laggards (16 percent). These are based on a normally distributed population.[10]

Rogers and Shoemaker developed a model describing the stages through which an individual passes from first knowledge of an innovation to a decision to adopt or reject it. Awareness of the innovation is followed by interest, a period of evaluation, a trial use of the innovation, and eventually, adoption. This model is particularly useful in describing the sources and channels of information used by the individual in the adoption decision and the attitudinal changes associated with adoption.[11]

Research on technology adoption in journalism has focused primarily on the adoption of computers for text editing.[12] Slater, et al. found that students using VDTs made fewer mechanistic changes and more structural ones than students using paper and pencil, suggesting that the change in technology affected how editors shaped the content of the news.[13]

Much of the research on college student newspapers has been on the role of the papers' advisors rather than on the nature of the educational

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10 Everett M. Rogers, *Diffusion of Innovations*,

11 Everett M. Rogers and F. Floyd Shoemaker, *Communication of Innovations: A Cross Cultural Approach*, (New York: Free Press, 1971), 52-70.

12 For examples see William R. Lindley, "From Hot Type to Video Screens: Editors Evaluate New Technology," *Journalism Quarterly* 65 (Summer 1988): 485-89; Linda J. Shipley and James K. Gentry, "How Electronic Editing Equipment Affects Editing Performance," *Journalism Quarterly* 58 (Autumn 1981): 371-74; Starr D. Randall, "Effect of Electronic Editing on Error Rate of Newspaper, *Journalism Quarterly* 56 (Spring 1979): 161-65; James A Crook, "How the New Technology Affects Student Editing," *Journalism Educator* 31 (January 1977): 12-15,46

13 Michael D. Slater, Donna Rouner, and Martha Tharp, "Impact of VDTs on structural and mechanical editing," *Journalism Educator* 45 (Winter 1991):45-48.

experience newspapers provide,[14] although studies have investigated aspects of college newspapers such as staff compensation,[15] and the legal implications of court decisions regarding free press issues.[16] Still, none have specifically examined the adoption of a new technology over time for either educational or business related reasons. This is somewhat surprising since more than half of college journalism programs report that work for a college newspaper is part of the curriculum requirements.[17]

In 1982 the Gannett Foundation did fund an extensive survey of daily college newspapers by Paul Atkins.[18] Although more broadly focused than this study, Atkins examined technological issues, but his report was exclusively descriptive rather than analytic. He found that the majority of daily newspapers were using video display terminals and photo typesetters and many reported transition problems. Atkins also reported that somewhat less than one-half of the papers had "moderately good" to "excellent" photographic facilities but suggested that many suffered from inadequate labs and photo equipment.

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14 For example, Lillian Lodge Kopenhaver and Ronald E. Spielberger, "Advisors post some gains, fewer losses," *College Media Review* 30 (Summer/Fall 1991): 19-23; Michael Ryan and David L. Martinson, "Attitudes of College Newspaper Advisers Toward Censorship of the Student Press," *Journalism Quarterly* 63, (1986): 55-60.

15 For example, Lillian Lodge Kopenhaver and Ronald E. Spielberger, "Surveying student newspaper compensation," *College Media Review* 32 (Winter/Spring 1993): 27-32;

16 Ruth Walden, "Editorial rights, constitutional restraints of editors of state-supported newspapers," *Journalism Quarterly* 62 (Autumn 1985): 616-25; Bruce Dudley, "Control of Small College Student Newspapers," *Journalism Quarterly* 48 (Fall 1971): 21-22.

17 This figure reported in Gerald M. Kosicki and Lee Becker, "Annual Census and Analysis of Enrollment and Graduation," *Journalism Educator* 47 (Autumn 1992): 67.

18 Paul A. Atkins, *The College Newspaper in the United States*, (Parsons, W.Va.: McClain, 1982) See also Julius Duscha and Thomas Fisher, *The Campus Press: Freedom and Responsibility*, (Washington, D.C.: American Association of State Colleges and Universities, 1973), for a brief history of the campus press and a series of case studies of college newspapers' organizational structures.

Purpose of the Study

The study's purpose is to measure the adoption rate of digital imaging technology during the one year period immediately following the adoption of such technology at all Associated Press member newspapers. It also assesses the degree to which student photo editors perceive the new technology as a threat to newsphoto credibility and attempts to describe the relationship between technology adoption and credibility attitudes.

The study advances the following assumption and research questions:

A1: Once digital imaging technology has been adopted for routine use in a daily college student newspaper, the technology will not be abandoned within the two years of use.

RQ1: At what rate are daily college student newspapers adopting digital imaging technologies for the routine processing of news photographs?

RQ2: How do adopting papers differ from non-adopting papers in terms of circulation size, general technology levels, information seeking activity, and their willingness to adopt new technologies?

RQ3: What is the nature of the relationship (if any) between the adoption of digital imaging technologies and student photo editors' perceived effect of the technology on newsphoto credibility?

This study reports the first three time points in an ongoing survey investigation of digital imaging technology at college newspapers.[19]

Method

A mail survey of the 94 college newspapers in the *Editor & Publisher International Yearbook* listing four or more publication days per week was made in the fall of 1992, again in the spring of 1993 and then again in the

19 Funding for the surveys is supported by a grant from the National Press Photographers Foundation to the author.

fall of 1993 using largely identical questionnaires.[20] The cover letter for each survey was addressed to the newspaper's photo editor or chief photographer or "the photographer with the most authority over the photo staff." Seventy one editors responded to the first survey, 60 to the second, and 58 to the third.

In reporting results at each time period, the response from the most recently completed survey is used. More specifically, if no questionnaire was returned for the second period, responses from the first questionnaire are reported for the second time period as well as the first. Likewise, if a single question in the third questionnaire is missing, the response to that question from the previous period is used in reporting on the third period. This method conservatively measures adoption at each time point since a non-responding paper may be reported as a non-adopter even though it in fact had adopted the technology. The underlying assumption is that once the digital imaging technology is adopted it is not discontinued within the year time period serving as the cross section. Providing that this assumption is met, the effective response rate to the third questionnaire is 91.5 percent.

In the introduction to the questionnaire, digital imaging was defined as "the conversion of an image into a computer readable data file and the manipulations done on such a file prior to printing on paper." The questionnaire addressed three principal areas: 1) the paper's current level of technology in general, 2) its current use of digital imaging technology, and 3) the individual respondent's attitudes toward digital imaging and newsphoto credibility.

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20 This definition of daily college newspaper was used by Atkins, *The Daily College Newspaper*, 5.

Current technology levels were measured by whether the paper owned any of nine devices: a fax machine, a cellular phone, an answering machine, a television, a video cassette recorder, a radio frequency scanner, a laptop computer, an electronic mail system, or a super telephoto camera lens, as well as whether text-editing was done on a network of microcomputers or a mainframe. The questionnaire also asked whether the paper subscribed to a wire service and how often it published process color photographs. Additionally, the respondent was asked to rate the general willingness of their newspaper to adopt new technology as either "quick, average, or slow" to adopt.

All respondents were asked if their paper had ever published a digital image and whether the majority of their wire or staff photos were processed digitally. Those who responded affirmatively to both were asked when they began routine use of digital imaging technology. All respondents where asked whether they had visited a general circulation newspaper to learn more about digital imaging, whether its adoption at newspapers would increase, decrease, or not influence the credibility of news photos in the future, and whether their college paper had a written set of guidelines concerning ethical photojournalism. Finally, respondents were asked whether in an "ideal newsroom" anyone other than the photo staff should be allowed to adjust image characteristics.

Findings

Of the 86 respondents, 54 said their newspaper had published at least one photograph using digital imaging technology as an experiment. That is 62.8 percent of the newspapers responding to these three surveys and at least one-half of *all* daily college newspapers. Twenty eight papers (32.6 percent of respondents) use computers to process the majority of their wire

and/or staff-produced photographs on a routine basis. Both the trial stage and the adoption stage figures increased considerably over the three time points measured.

Examination of the responses to each of the three questionnaires indicated that no newspaper discontinued use of digital imaging once they had adopted it. This finding supports the non-abandonment assumption made above.

General Description of Respondents

Before addressing the research questions directly, a description of a statistically average college daily will provide a base for comparison. That "average" paper has a daily circulation of 14,418 newspapers[21] produced by a staff of 10 photographers. The news is written and edited using a network of microcomputers and the Associated Press's text wire service. Color photos are printed 12.6 times per year. The average photo editor is a full-time student majoring in journalism who believes digital imaging technology will eventually decrease the credibility of newsphotos.

While the statistical average is enlightening, college dailies are far from uniform. Circulations range from a low of 3000 to a high of 38,000 and photo staffs range from one to 30 photographers. Over 94 percent of responding papers subscribe to a wire text service, but only 12.8 percent subscribe to a wire photo service (all AP). Although the majority print process color photographs at least once a year, 30.2 percent never do and six papers print full color in more than 50 issues per year.

In addition to computerized text-editing and color printing, college newspapers use a considerable number of new technologies daily. Of the

21. Circulation figures are from *Editor & Publisher International Yearbook* (1993). All other figures are questionnaire results.

nine items asked about, the average paper uses four of them on a regular basis. The fax machine showed the greatest saturation rate (93.0 percent) and the cellular telephone the lowest (4.7 percent). More than a third described their paper as quick to embrace new technology (38.4 percent) and only 22.1 percent said they were slow to do so.

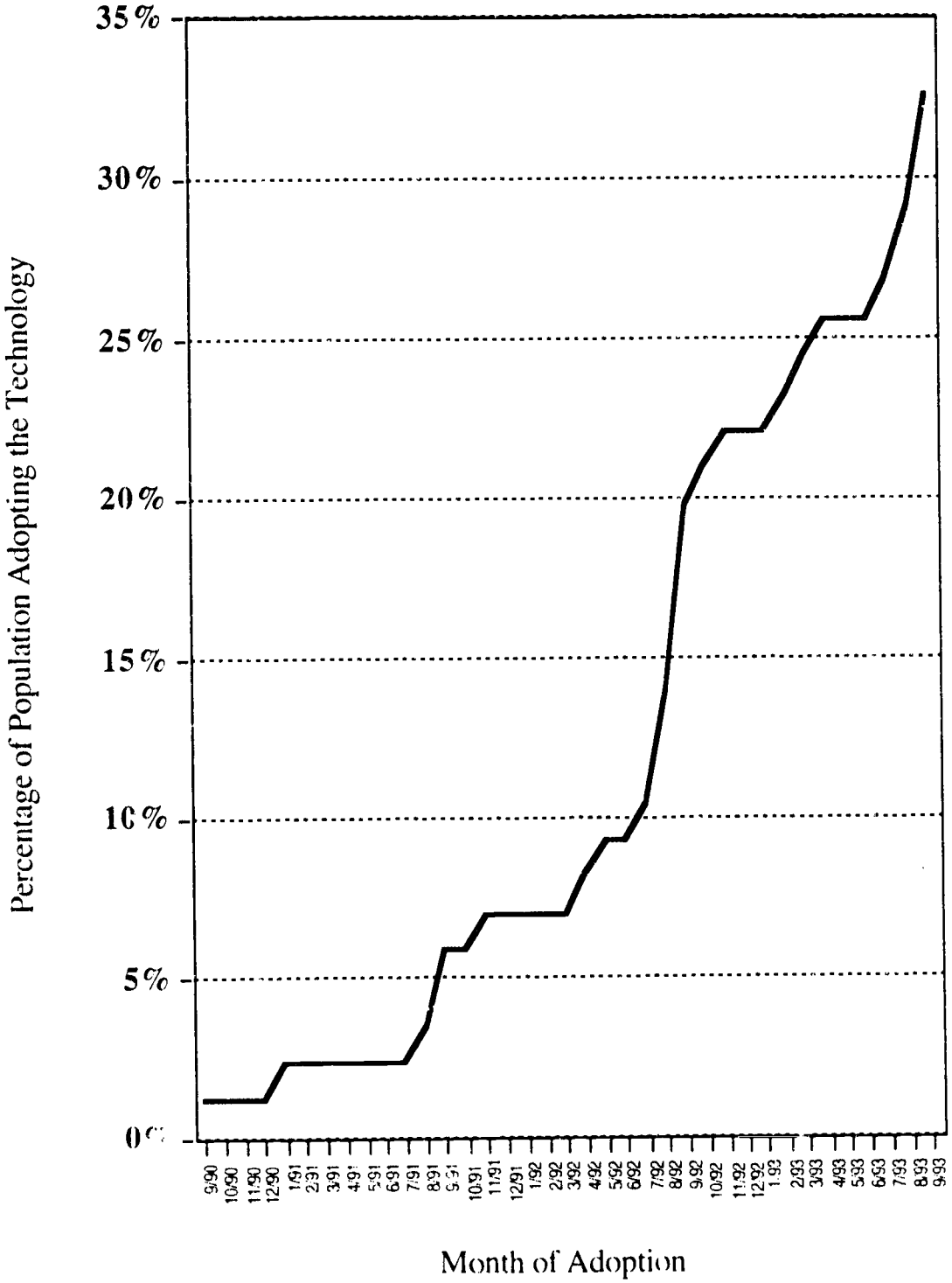
Adoption Rate of Digital Imaging Technology

The 28 newspapers that use digital imaging technology to process the majority of either their staff or wire photos are still relative newcomers to the technology. One paper said they'd been using the technology routinely since September 1990. The yearly adoption rate was as follows: five more adopted it in 1991 (17.9 percent of the 28 adopters), 13 in 1992 (46.4 percent), and nine during the first nine months of 1993 (32.1 percent). Interestingly, when asked to estimate the percentage of college dailies using digital imaging routinely, the mean estimate was 30.3 percent. Even though the standard deviation around this estimate was 20.4, it nevertheless suggests a high level of awareness of adoption among the respondents.

The actual adoption rate, when plotted cumulatively on a monthly basis roughly approximates the first third of the S-shaped adoption curve predicted by Rogers with slight variation occurring each year in the early fall—traditionally the beginning of the college school year. See Figure 1.

Figure 1.

Rate of Digital Imaging Technology Adoption at College Dailies



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Participation in the trial stage—testing the technology without adoption for routine use—appears to have begun prior to this study's initial measurement and the foot cannot be established. Nevertheless, over the course of the three periods measured, respondents reporting a trial increased considerably. By October 1992, 32 (47.1 percent) had tested digital imaging. By April 1993, 44 (55.7 percent) had done so and by October 1993 there were 54 papers (62.8 percent) in the trial stage.

Comparison of Adopting and Non-Adopting Newspapers

An organization's size, its general level of technology adoption, its perception of its own innovativeness, and its sources for information about innovation are all thought to contribute to the adoption decision. Circulation differences between the adopting and non-adopting newspapers were small and varying over time. In the initial time period measured, adopting papers were slightly smaller than non-adopters, but as the adoption rate increased, the average size of adopters also increased. By the last measurement period, adopters were larger on average than the non-adopters. Adopters' average level of technology use (as measured) was slightly higher than non-adopters and remained that way across all three measures. They published process color far more often than non-adopters, although both groups increased their average color production dramatically during the year measured. Adopters perceived themselves as considerably quicker to embrace new technology than did others, even though they were only slightly more likely to have sought out detailed information about digital imaging by visiting a newspaper that had it in place. See Table 1.

Table 1.

Differences between Adopting and Non-adopting Newspapers
(Mean responses. Ranges for constructed variables in brackets. N in parentheses)

		Oct. '92	Apr. '92	Oct. '93
Daily circulation size				
	Non-adopters	14878 (53)	14514 (58)	13984 (58)
	Adopters	14276 (15)	14912 (21)	15320 (28)
Current use of new technologies				
[0 to 9, higher is more]	Non-adopters	3.83 (53)	4.05 (58)	4.02 (58)
	Adopters	4.93 (15)	4.76 (21)	4.29 (28)
Quickness to embrace new technologies				
[1 to 3, one is quickest]	Non-adopters	2.18 (51)	2.12 (58)	2.10 (58)
	Adopters	1.20 (15)	1.40 (21)	1.29 (28)
Yearly use of process color				
[days]	Non-adopters	3.36 (52)	6.47 (58)	8.72 (58)
	Adopters	11.20 (15)	10.05 (20)	20.50 (28)
Information sought at another paper				
[0=no, 1=yes]	Non-adopters	not measured	.67 (43)	.65 (48)
	Adopters	not measured	.61 (21)	.70 (23)

Relationship Between Adoption and Newsphoto Credibility

The student editors responding to the survey were generally quite pessimistic about the future of newsphoto credibility in the digital era. When asked in the most recent questionnaire whether the use of digital imaging technology by newspapers would increase, decrease, or not change the credibility of newsphotos, 63.9 percent said it would decrease credibility. Additionally, the percentage of editors expressing this view had grown substantially over the course of the three measurement periods—55.4 percent in the second and 39.4 percent in the first.

Editors at adopting papers were more likely to say the technology will decrease credibility than their non-adopting counterparts at periods two and

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three. But the very early adopters measured in the first period were much less pessimistic than their non-adopting counterparts, and far less so than adopters were at the later dates measured.

Few newspapers had written policy guidelines on ethical photo manipulation, although adopters were far more likely to have one than non-adopters. Even so, over the course of the three periods, the percentage of adopting papers with written guidelines decreased from over a third at the first period to about a quarter by the third. When asked about operations in an "ideal newsroom," few respondents would allow anyone other than photo staff members to adjust photographs beyond simple sizing and cropping changes. Adopters were even less likely to tolerate non-staff adjustments than non-adopters. Although the difference between groups is small, the percentage of all respondents saying others should make adjustments was never more than 20. See Table 2.

Table 2.

Differences between Adopting and Non-adopting Newspapers
(Percentage responding "yes". N in parentheses)

	Oct. '92	Apr. '92	Oct. '93
Digital imaging will decrease credibility			
All respondents	34.9 (63)	55.4 (74)	63.9 (83)
Non-adopters	38.0 (50)	53.7 (54)	61.8 (55)
Adopters	23.1 (13)	60.0 (20)	67.9 (28)
Paper has photo manipulation guidelines			
All respondents	9.0 (67)	13.3 (75)	10.6 (85)
Non-adopters	1.9 (53)	7.3 (55)	3.5 (57)
Adopters	35.7 (14)	30.0 (20)	25.0 (28)
Non-photo staff should be allowed to adjust images			
All respondents	17.5 (63)	19.2 (78)	12.9 (85)
Non-adopters	20.4 (49)	20.7 (58)	14.0 (57)
Adopters	7.1 (14)	15.0 (20)	10.7 (28)

Discussion

As predicted by the diffusion of innovation research reviewed earlier, adoption of digital imaging technology at the country's daily college student newspapers is following a s-curved (sigmoid) pattern and about one third of the population is now using the technology for routine processing of news photographs. The primary anomaly seen in the cumulative percentage diffusion curve is a cyclical pattern where adoption decisions are clustered around the fall of each year—traditionally the beginning of the school year and fiscal budget.

All eighty six respondents indicated awareness of and some interest in the innovation, and all indicated some level of information seeking behavior. Indeed, more than two thirds of the respondents had visited general circulation papers to learn more about digital imaging first hand. But the best indicator of adoption stage at the time of the surveys is that almost two thirds of respondents had published at least one digitally processed image as a test. Therefore, approximately one third of the population has adopted the technology, one third has entered the trial stage, and the rest are most likely in the evaluation stage. Transferring these percentages to the adoption and innovation life-cycle curve, the surveys indicate that the daily college newspapers were well into the "early majority" stage by October 1993, the most recent measurement period.

The first survey for this study found that 16 percent of respondents had adopted the technology. Coincidentally, this is the same percentage Rogers' classified capturing the "innovators" and "early adopters" in his life-cycle curve. Although circulation size was roughly the same for both adopters and non-adopters, there were three observed differences between the early adopters and the rest that suggest they somewhat fit the theoretical profile of that stage. These innovators/early adopters were on average heavier users of

the non-photographic technologies and heavier users of process color printing (a more technologically involved process than black or spot-color printing) than were either later adopters or the contemporary non-adopters. This small group was also more likely to describe their papers as "quick to embrace new technology" than were the others. See Table 1. These differences between adopters and non-adopters are in the same direction at time points two and three also, but they are not as large as at the first time point. This suggests that the early adopters are distinguishable from the later adopters and that adopters differ according to organizational perception of risk taking and leadership. Indeed, in responses to an open-ended question about digital imaging generally, six of the 15 editors responding to the first survey mention "leadership" or "leaders" as part of their paper's reputation and that use of digital imaging was simply a part of that role. As the population enters the late majority stage, one would expect the observed differences between adopters and non-adopters to moderate even further.

The innovators/early adopters were also quite different from both the non-adopters and their later adopting counterparts regarding certain aspects of newsphoto credibility. The innovators/early adopters were far less likely to describe the technology as a threat to credibility. Even so, they were more likely to establish codified, written guidelines for ethical photo handling and to prefer restriction of the technology to the photographic staff exclusively.

Certainly the potential for abuse using the technology was widely known prior to even the earliest college newspaper adoption. The *National Geographic* had stirred up considerable controversy in journalistic circles when it used an early version of today's technology to move two Egyptian

pyramids closer together on a 1982 cover.[22] Since then, the National Press Photographers Association, the Associated Press, and numerous other news organizations have issued guidelines and protocols in an attempt to safeguard the credibility of photographic images published in the press.

Perhaps because they were aware of the controversy, the first group of student editors to find themselves in a similar technological situation established clear guidelines at the start, educated their staffs, and restricted use of the technology only to those specialized few. With these precautions taken, their belief in an uncompromised future may have felt secure.

But as adoption proceeded into the early majority stage, fewer staffs established guidelines, fewer editors could envision exclusive control of a technology so easily used, and fewer believed that the credibility of the photographic report could be maintained. Both adopters and non-adopters were increasingly skeptical of the profession's ability to control the negative effects of the technology on photo credibility.

This study cannot determine whether the dramatic increase in pessimistic attitudes is the result of factors internal or external to the college newspaper organization. But the pattern of responses does suggest that the difference between adopters and non-adopters may well be attributed to hands on experience in the day-to-day operations of the campus press. If so, doubt in the audience's willingness to believe newspaper photographs is likely to increase further as the adoption curve continues is upward climb. Journalism educators would do well to keep these increasingly pessimistic outlooks in mind as they discuss ethics and professionalism with their photojournalism students.

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22 See Bennett Daviss, "Picture Perfect," *Discover*, July 1990, p. 54-58, and Jonathan Alter, "When Photographs Lie," *Newsweek*, July 1990, for this and numerous other examples of digital retouching in editorial photographs.