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The Usage of Virtual Technologies for Contract Proofs In Commercial Printing Organizations

by Bruce Leigh Myers, Ph.D. • Rochester Institute of Technology

Introduction

In the Fall 2013 edition of the *Visual Communications Journal*, results from a study regarding the adoption of technologies for contract color proofing in commercial printing were reported. The research highlighted selected results of a quantitative survey, and compared proofing technology adoption to a comprehensive 2005 study by the Print Industries Market Information and Research Organization (PRIMIR) entitled *Dynamics and Trends in Color Proofing 2005–2010.* Reported was proofing technology usage as compared to the 2005 report using Everett Rogers' Diffusion of Innovations as a framework. Findings indicated that among commercial printing organizations less sophisticated technologies were being increasingly utilized: these include non-color managed virtual proofs and jobs that required no proof at all. Further, it was reported that hardcopy continued to be dominated by inkjet technologies together with toner-based technologies, including digital presses, commonly utilized for contract proofing work. Another key finding was that among commercial printing organizations, the reported use of halftone-based hardcopy proofing technologies was virtually unchanged since the 2005 study.

For the present report, additional data obtained from the same study was examined. Specifically, commercial printing respondents were asked which factors underlie their decision to utilize virtual proofing versus hard-copy proofing technologies. In addition, these same respondents were asked about projecting the utilization of virtual proofing, hard copy proofing, and jobs that require no proof at all in the next three years, and through the rest of the current decade.

For the purposes of the present study, important definitions are as defined below:

Contract color proofs are defined as a proof that represents what the job will look like when printed on a lithographic press. For a proof to be considered a contract color proof, the customer agrees to accept output that matches the contract proof, and the printer agrees to produce output that matches this proof. Although there could be contract proofs for black-and-white printing, for the purposes of the present study the term contract proofs is used to refer to those contract proofs intended to represent color work.

Commercial lithographic printing organizations are defined as firms that provide lithographic printing, typically performed on a job basis, and is frequently advertising-driven. Included in this definition are printed products such as catalogs, directories, brochures, and posters. Printing excluded from this definition are publications such as newspapers and magazines as well as books, business forms, labels, tags, financial, and packaging printing.

Virtual proofs are defined here as proofs displayed on a monitor display. These proofs are sometimes also known as soft proofs. It is relevant to note that some reserve the term *virtual proof* for monitor-based proofs that are carefully calibrated in such a manner that they can accurately simulate process color printing, whereas soft proofs include uncalibrated monitor-based displays. As the present study is concerned with contract color proofing, and some commercial printers utilize uncalibrated displays as contract proofs, the term virtual proof is used here for any monitor display utilized as a contract proof regardless of calibration.

Need for the Study

One decade ago, virtual proofing was promoted as a technology promising to eclipse hard copy proofing technologies. In 2003, both ICS Remote Director and Kodak Virtual Matchprint, two prominent virtual proofing technologies, earned GATF InterTech™ Technology Awards. In that same year, some predicted that within three years virtual proofing technologies would be the "…de facto standard…"[1]. Indeed, the fanfare surrounding virtual proofing at the time suggested a growth trajectory that was reflected in the projections reported in the 2005 PRIMIR study, which anticipated double-digit increases resulting in an increase in virtual proofing adoption to almost 25% of all contract proofs by 2009 in the commercial printing market. In contrast, the present research suggests that this adoption rate is largely unrealized: as reported in the Fall 2013 Visual Communications Journal, virtual proofs accounted for 16% of all contract proofs utilized by commercial printers with 20–49 employees, up from 7% reported in the PRIMIR study. For larger commercial printing operations the usage of virtual proofing technologies for contract proofs either declined or remained largely the same: organizations with

50–99 employees, reported that 10% of all contract proofs coming from virtual technologies, down from 14% reported in 2005 by PRIMIR. For the largest commercial printers with 100+ employees, reported virtual proofing usage for contract proofs were largely unchanged from the PRIMIR study, at 9%.

Recognizing the disparity between the projected and presently reported adoption rates of virtual proofing, an examination of the factors which underlie commercial printing pre-media managers' impression of the respective technologies could yield insight into factors which underlie the current state of proofing technology adoption. Further, the projections of these same managers for the respective technologies may possibly serve as a benchmark for future studies of this type.

Purpose

Using a cross-sectional questionnaire instrument, the present study collected quantitative data intended to assess the acceptability of virtual proofs as contract proofs, and to examine the relative importance of technical and job-related factors that comprise the impression of the proofing technologies of pre-media managers at commercial printing organizations. Finally, these same managers were asked to report their projections of the relevant proofing technologies in the next three years, as well as for the remainder of the decade.

A greater understanding of these issues could be relevant to various stakeholders in the graphic communications industry, including those in the creative and print purchasing community, printing production management and personnel, vendors, standards committees, specifications organizations, and educators.

Literature Review

The 2005 *PRIMIR* study offers a comprehensive analysis of multiple types of proofing across several industry segments. Although segment differences were reported by PRIMIR, an overall trend was noted: printers were reported as increasingly moving away from hardcopy halftone-based proofing to digital technologies that are not halftone-based: these technologies include inkjet, toner-based, and virtual proofing. Further, PRIMIR discussed anticipated proofing trends, which include the continued emergence and increased use of monitor-based soft proofing.

As the present study is concerned with technical and job-related factors affecting the adopting of proofing technologies, technical literature relevant to proofing is germane. Michael H. Bruno's *Principles of Color Proofing* (1986), although over 25 years old, provides definitions and proofing criteria that is still relevant today: some may consider this edition to the seminal work on the technical analysis of color proofing. More recently, Gary G. Field's *Color Printing Excellence* (2013) provides a current analysis of relevant technical factors which are germane to proofing, as does IDEAlliance's *Guide to Print Production* version 12.0 (2012).

Research Design and Methodology

Using a self-reported questionnaire instrument distributed through the U.S. Mail, pre-media managers working at graphic communications organizations were selected to receive the survey in the Spring of 2013. For the sampling frame, the 2012 *Printing Impressions Top 400* list was utilized, from which 100 potential respondent organizations were selected. In a manner consistent with Dillman's *Mail and Telephone Surveys, The Total Design Method* (1978), potential respondents were initially contacted with an introductory letter, followed in several days by the survey instrument package. The survey package included the survey instrument booklet, a letter of instruction, and postage-paid return envelope. Two weeks after the initial package mailing, a reminder was sent to non-respondents, and approximately ten days after the reminder postcard a second survey package was sent to those who had not yet responded by that time. To potentially increase response rates, steps were taken to assure the respondent's anonymity.

As the research is limited to general commercial lithographic printing, an initial qualifying question which defined general commercial color lithographic printing asked those that did not do this type of work to disqualify themselves and to return the survey packet with the remainder of the questions unanswered. Of 100 mailed surveys, 4 were returned as self-disqualified: in these cases the respondent indicated that no commercial printing was conducted at that specific location. Forty-nine respondents identified their organizations as performing commercial printing, and responded to the majority of the subsequent questions.

Data Analysis and Results

The study solicited information regarding the acceptability of virtual proofing technology as contract proofs. These data were compared to that which was obtained in

the 2005 PRIMIR research report, as illustrated in Figure 1. When color managed virtual proofs are considered, those indicating that such technologies are either somewhat or totally acceptable increased from 52% to 81%, and when non-color managed virtual proofs are considered those responding somewhat or totally acceptable increased to 58% from 52%. Likewise, those with no opinion regarding the acceptability of virtual proofs as contract proofs decreased for both color managed and non-color managed technologies. Subsequently, there was a decrease in those that reported that the virtual technologies were unacceptable when the present results are compared to the 2005 PRIMIR study.

In addition, respondents were asked to evaluate the importance of various technical criteria when comparing virtual proofing technology with hard-copy proofing technology. The criteria here, which were selected from a review of the relevant technical literature, are: Repeatability, Ability to Simulate a Correct Dot Gain [2] Curve, Ability to Simulate Actual Dot Gain, Ability to Simulate the Color of the Substrate, Ability to Simulate a Varnish or a Non-varnish Finish, Ability to Hold Highlight and Shadow Dots, Ability to Proof Custom Colors, and the Ability to Maintain a Minimal Environmental Impact. The results are summarized in

Acceptability of Virtual Proofs as Contract Proofs

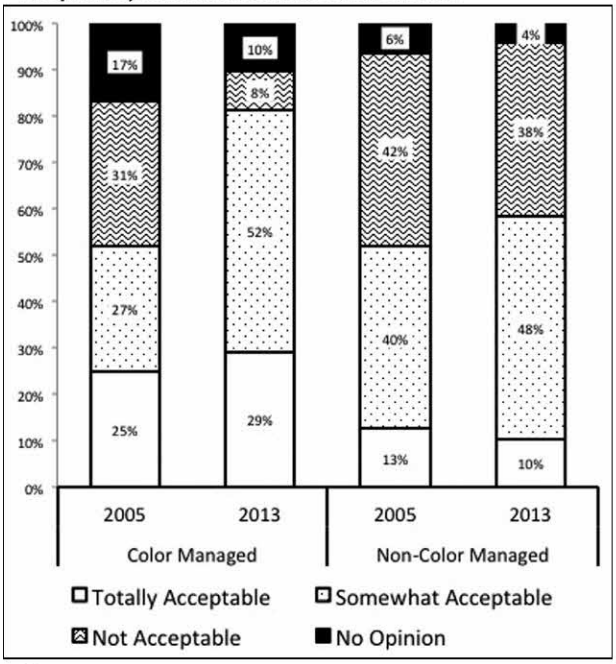

Figure 1

Proofing Technical Factors

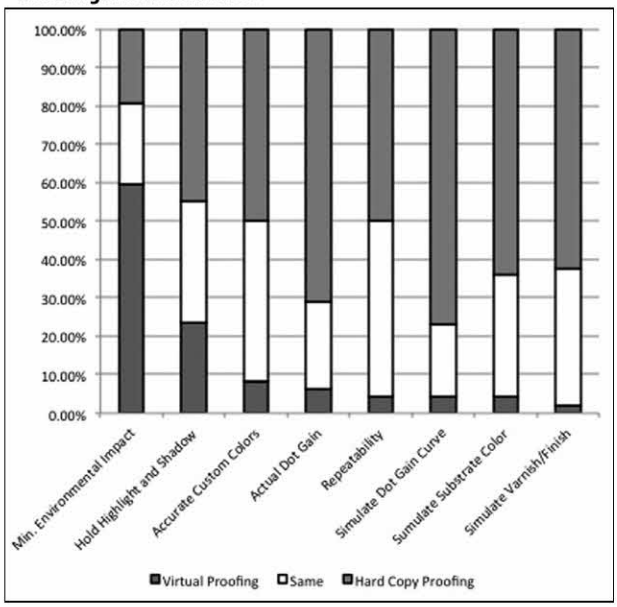

Figure 2

Figure 2. Here, the respondents indicated that the only factor where virtual proofing was reported as having a clear advantage over hard copy proofing was in reducing environmental impact.

Further, hard copy proofing technologies were reported better than virtual proofing technologies in criteria related to dot gain, specifically the ability to simulate the correct dot gain curve and the ability to simulate actual dot gain. Clearly, the respondents generally believed that these printing press-specific factors are better simulated by hard copy proofing technologies than by the virtual proofing counterparts.

Turning to an analysis of job-related factors, the literature suggest that the following criteria are relevant in the selection of a technology for contract color proofs: Turnaround Time, Quality of the Job, Type of Job, Complexity of the Job, Price Customer is willing to Pay, Format of the Document, Dependability of the Required Equipment, Type of Substrate Utilized for the Job and Only Proofing Technology Available. The reported results indicated that 90% of the commercial printing respondents based their decision to utilize virtual proofing technology as a contact proof were influenced by turnaround time, and more than 80% of the responses paid more attention to the "quality level of the job" and the "type of print job" in their selection of proofing technologies.

Proofing Job Related Factors

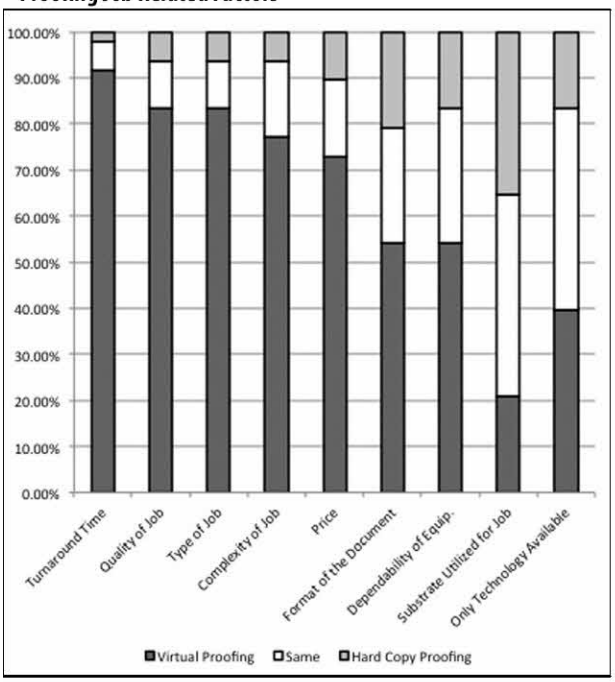

Figure 3

Results for all of the criteria analyzed are reported in Figure 3.

It is relevant to note that when comparing the rank order of job related factors from the 2005 PRIMIR study to the present research, turnaround time replaced the quality of the job as the most important job related determinant of proofing technology, as illustrated in Table 1.

Table 1: Comparison of Ranked Order of Job-related Factors, 2005 and 2013

2005	2013
Quality of the Job	Turnaround Time
Type of the Job	Quality of the Job
Complexity of the Job	Type of the Job
Price Customer is Willing to Pay	Complexity of the Job
Turnaround Time	Price Customer is Willing to Pay

When respondents were asked to predict future trends in technologies utilized for contract proofs, as illustrated in Figure 4, over 60% indicated a large or moderate increase in virtual proofing technologies, versus a 35% large or moderate increase of digital hardcopy proofs in the next three years. Over 40% indicated a large or moderate increase in jobs requiring non-contract proof at all.

Similar projections were made for the 2017–2020 time period, although it is perhaps relevant to note that nearly a quarter of the respondents predicted either a large or moderate decrease in virtual and digital hardcopy proofing in the rest of the decade.

Findings

When compared to the 2005 PRIMIR study, the present study indicates that current commercial printing organizations are generally more accepting of virtual proofing: pre-media managers at commercial printers are generally more open to the utilization of virtual proofs as contract color proofs.

Further, when examining technical factors related to contract color proofing, it is recognized that virtual proofing surpasses hard copy proofing in the minds of pre-media professionals working at commercial printing organizations in terms of minimizing environmental impact. Hardcopy proofing was reported as being perceived as especially superior when dot gain related factors were considered, namely, the ability to simulate a correct dot gain curve and the ability to simulate actual dot gain.

One curious finding in the analysis of the technical factors is that less than 9% of the respondents indicated that

Projected Proofing Adoption Trends

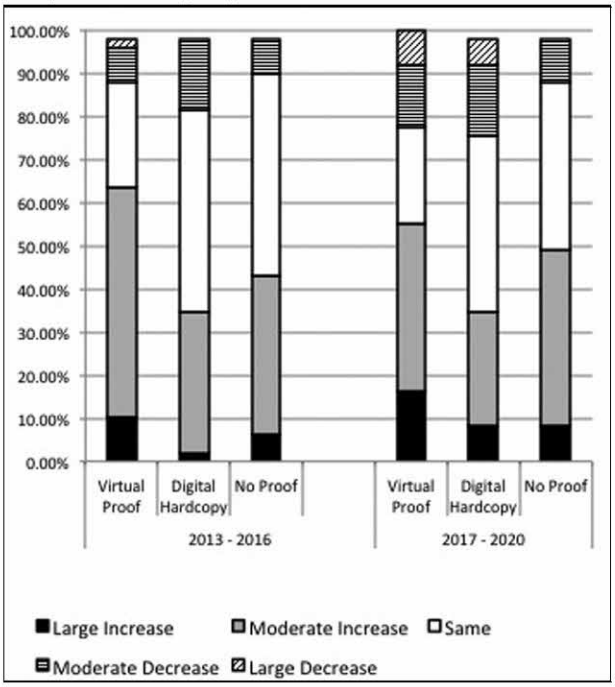

Figure 4

the technical criteria "ability to proof custom colors" was important in the decision to select virtual proofing technologies. It is recognized that this particular criterion has historically been widely touted as one of the primary reasons for selecting virtual proofing technologies over hard copy proofs. It is likely that today's expanded gamut inkjet technologies are capable of sufficiently reproducing many custom colors, and could have therefore largely negated the formerly purported advantage of certain virtual proofing solutions.

In regard to job-related factors, perhaps the most striking difference between the present study and the 2005 *PRIMIR* research is the importance of turnaround time versus other job-related factors involved in contract color proofing selection. Ranked as the fifth-most important criteria in 2005, today it is regarded as the most important factor. This finding may be emblematic of an increased demand for fast turnaround in commercial printing jobs, where there could be insufficient time to produce a hard copy proof and to meet the required deadline.

Finally, when asked their opinions about future trends over the next three years and for the remainder of the decade, a large or moderate increase in virtual proofing technologies was indicated by the majority of the respondents, as was a large or moderate increase in jobs requiring no proof at all. This supports the recognition of a trend toward less sophisticated, faster turnaround technologies for contract color proofs. It is also relevant to note that a quarter of the respondents predicted a large or moderate decrease in virtual proofs and digital hardcopy proofs when the 2017–2020 time period is considered.

Conclusions

It is frequently interesting and relevant to compare the adoption and usage of innovations several years after their onset to ascertain if the often hyperbolic claims surrounding their introduction are realized. The present study indicates that, although today's pre-media professionals in the commercial printing segment are more open to the use of virtual proofing, these technologies are not in the position of prominence predicted by some a decade ago. Further analysis of the factors surrounding this realization suggests that hard copy proofs are perceived as superior to their virtual counterparts in many technical aspects, and that virtual technologies are turned to when fast turnaround of jobs is paramount.

Future Research

The present study was limited to larger commercial lithographic printing organizations; future researchers may choose to examine additional market segments, including packaging, publication, advertising agencies and in-plant printing operations, as well as smaller commercial organizations. In addition, a qualitative approach to similar topics could uncover a richer understanding of salient factors here, versus the cross-sectional approach utilized in the current research. Further, this present research is limited to technologies serving as contract proofs only: an examination of the technologies utilized to produce intermediate proofs could yield a more comprehensive view of the proofing market as a whole.

Acknowledgement

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End Notes

[1]Dan Caldwell, vice-president, operations for Integrated Color Solutions Inc., as quoted in Bury, S. (2003).

[2]It is recognized that many standards committees and specification organizations currently recommend the use of the term "tone value increase" rather than the historic term "dot gain." For the purpose of the present research, however, "dot gain" is utilized as it is the normal vernacular utilized by many printing organizations. It is presumed likely that users of the term "tone value increase" understand that this is a substitute for the historic "dot gain" terminology, however the opposite case is less likely.