Media Distribution
in the Printing Industry

Traditionally, printers have not regarded physical print distribution as a profit center. However, this trend is changing, as shown in the RIT Printing Industry Center's research monograph *Media Distribution in the Printing Industry*, by Twyla J. Cummings, Ph.D., and Bernice A. LeMaire (PICRM-2005-03). Offering mailing, warehousing, and distribution capabilities to customers has become advantageous for print services providers.

Terminology

The first question asked of the 16 printing companies in this study was how "distribution" was defined within their companies. The researchers generated this composite definition from the various responses:

Distribution is the movement of finished product from a printing plant to:

- an internal storage location,
- the customer,
- a distribution center, or
- the end user.

It is a customer service offering that starts when the job is scheduled. Efficient distribution involves the use of market expense to negotiate freight rate and logistics services, routing, and overall compilation or management and organization of products and distribution. Other aspects of distribution include warehousing, shipping, inventory management, fulfillment, and kit packing.

R·I·T

Printing Industry Center

New RIT Book Focuses on Personalized Digital Printing

Customized marketing communications is revolutionizing the way advertising agencies and print services providers are leveraging their digital printing. What's the payoff? What strategies should be utilized?

Data-Driven Print: Strategy and Implementation, a new book from the Rochester Institute of Technology Printing Industry Center and RIT Cary Graphic Arts Press, examines these questions and gives a clear plan to print companies and marketing managers for harnessing the power of customized marketing communications.

Patricia Sorce, Ph.D., administrative chair of RIT's School of Print Media and the primary author of *Data-Driven Print*, has focused her career on analyzing buyer behavior and relationship marketing. Michael Pletka, co-author of the book, is a recent RIT Printing Industry Center scholar, who currently manages financial modeling for digital print solutions at Xerox Corp.

Data-Driven Print fills a gap in the industry literature by advising its readers on strategic issues, technical concepts and the measurability of success through investment in personalized digital printing. "Just as Internet technology has allowed businesses to customize the online shopping experience, digital printing technology has enabled firms to create colorful, personalized, and more relevant printing marketing communications," writes Sorce and Pletka.

Data-Driven Print

STRATEGY AND IMPLEMENTATION

Patricia Sorce
Michael Pletka

Cary Sherburne, a senior editor of WhatTheyThink.com writes, "Whether you are a marketing executive, senior manager in an advertising agency, or a print services provider, this book will arm you with facts and strategies that will help you capitalize on and benefit from the rapidly growing segment of business communications."

Research for *Data-Driven Print* was originally sponsored by the RIT Printing Industry Center in fulfillment of its directive to conduct strategic analyses of the field. Patricia Sorce, formulated the book's foundation through more than 20 years of experience as an applied psychologist and associate professor of marketing in RIT's College of Business. In addition to her role as administrative chair of RIT's School of Print Media, she is co-director of the RIT Printing Industry Center. Michael Pletka holds a BS from the RIT School of Print Media, and an MBA from the RIT College of Business.

RIT Cary Graphic Arts Press is the publication arm of the Melbert B. Cary, Jr. Graphic Arts Collection at RIT, a renowned source for those studying printing history, bookbinding, typography, papermaking, calligraphy and book illustration processes.

More information is available at: http://print.rit.edu/sorce/
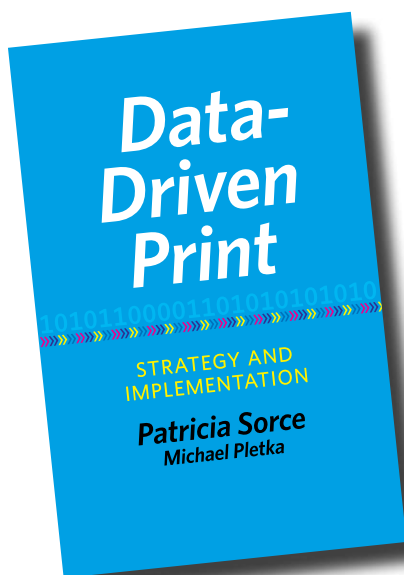
Variation in Premedia Color and the Potential Automation of Imaging Tasks

The affordability of software-based production tools has enabled the decentralization of premedia (prepress) services to creative professionals, advertising agencies and other imaging professionals. This has introduced an increase in variation of the quality and characteristics of color files submitted for print production. The lack of industry standards and specifications for most of the steps leading up to proofing is another factor extending the range of general practices. This month's research monograph, *Variation in Premedia Color and the Potential Automation of Imaging Tasks* by Michael Riordan (PICRM-2005-05), seeks to gain insight into the impact of variations in premedia imaging tasks related to color reproduction.

The research sample consisted of 27 U.S.-based companies comprised of 11 creative services providers (design firms, ad agencies, publishers) and 16 premedia and print services providers. Data was collected in several key areas:
• software color setting preferences,
• RGB and CMYK workflows,
• color correction workflows,
• use of color profiles,
• color proofing strategies,
• division of tasks between creative and premedia services,
• chargeable operations, and
• general comments about the process.

Color Imaging Workflows
Workflow typically begins with a creative professional trying to interpret the needs and interests of a specific client. Prepress/print production professionals then apply more technically-oriented changes to files in preparation for final

E-Commerce in the Printing Industry

When the data from a recent Printing Industry Center study on fulfillment trends in the printing industry indicated that e-commerce, not fulfillment, was perceived to be the primary value-added service currently being offered by printing companies, the researchers took note and devised a new set of parameters for a new investigation. Their result is the monograph summarized for this month's eReview, *Utilization of E-Commerce by Commercial Printing Companies*, by Twyla J. Cummings, Ph.D., and Bernice A. LeMaire (PICRM-2005-04).

Cary Sherburne, senior editor at Whattheythink.com, said, "One thing is certain: the successful printer of the future must incorporate an effective and automated Web-based customer interface and workflow" in order to remain competitive.[1] Paul Beyer, vice president of product marketing for software manufacturer Servador, had stated a similar conviction in an article that appeared in the September 2003 edition of *Graphic Arts Monthly* magazine. "The integration of Web-enabled print is part of a decade-long evolution of our industry, and people either get it, or they don't," he said. "The big issue now is what kinds of services printers can develop to leverage their expertise, and what they can do to generate new kinds of revenue."[2]

Integrating the Internet and print technology can provide customized and timely solutions to customers.

Distribution *continued*

This tight composite definition belies the wide variety of terminology used in the participants' initial responses. A subsequent question asked for comments on the difference between finishing and distribution; seven of the participants did not respond, and of those that did, half grouped finishing and distribution into the same department.

The participants were asked whether they considered distribution to be a value-added service. Of the 15 who answered this question, 14 did consider it to be a value-added service because for them it is a chargeable service. A preliminary Printing Industry Center study had recorded that Erik Cagle of *Printing Impressions* felt that mailing capabilities at that time (2003) may have seemed like a value-added bonus, but within two years those companies that had not committed to this discipline would find themselves in an unenviable minority.

Cagle's prediction was on target. PIA/GATF estimates that 45% of print volume ends up in the mail, amounting to about $72 billion in annual printing shipments delivered through the U.S. Postal Service. In fact, postage costs for print distribution frequently exceed all print-related manufacturing costs combined, and it appears that this trend will continue. Because customers increasingly want printers to handle distribution, printing companies are partnering with the U.S. Postal Service to establish onsite postal offices or delivery centers.

Workflows

The traditional print workflow encompasses processes from prepress through distribution. Following printing and binding, printed materials can be entered directly into one or several distribution channels. This traditional workflow (Figure 1) is known as print-and-distribute.

A new alternative workflow reverses the traditional steps and distributes a job in electronic form to a remotely-located print site for reproduction. This workflow has been described as "print's great paradigm shift," or distribute-and-print (Figure 2).

The main advantage of electronic distribution is saving the time and expense of shipping printed materials around the country or the world. Distribution costs are not eliminated in the distribute-and-print model, but the destinations are more local so costs are considerably lower.

Electronic distribution has not greatly impacted the distribution processes of the participants in this study since only four of them use this model. But the participants that offer print-on-demand (POD) services mentioned that POD has enhanced workflow and resulted in more end-user distribution, even though it is more expensive and requires more project management.

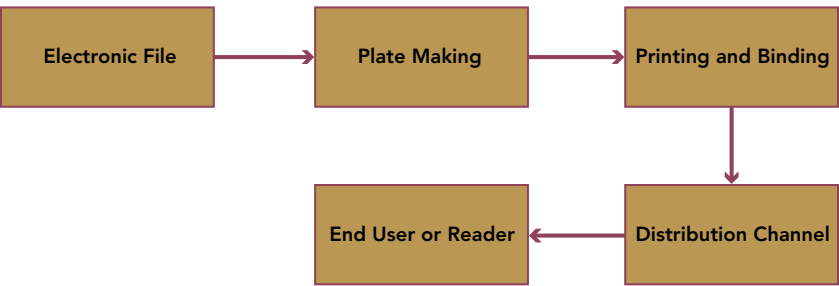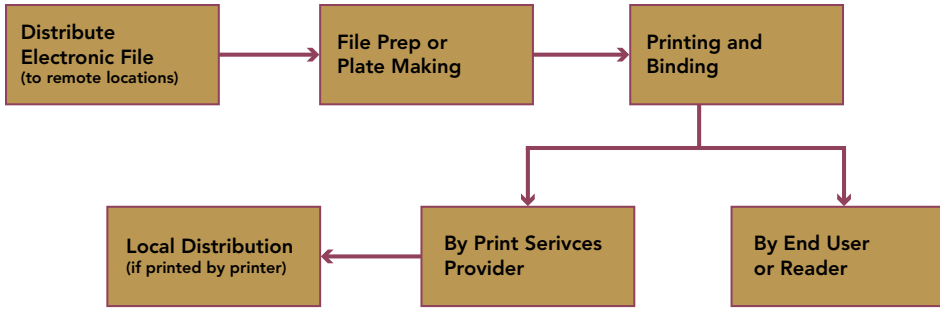**Figure 1.** Physical distribution of information

Figure 2. Electronic distribution of information

All of the companies that responded to our question about physical distribution workflows (12 out of 16) have developed a workflow process that is partially or completely standardized and documented. Though each company's workflow is different, all of them go through the basic steps illustrated in Figure 3.

A typical basic distribution workflow for smaller companies was derived from participant information from those companies (Figure 4), and a more sophisticated workflow was derived from the information received from larger companies (Figure 5).

Current Issues and Challenges

A few of the ten common challenges and trends that were discussed by a majority of the study's participants are:

• Storage and warehousing. Space is a major concern for work in progress, storage of raw materials, finished goods, and overruns. Most printers work with a just-in-time (JIT) model to avoid having to hold materials for customers. Many printers cannot take on the burden of offsite storage costs.
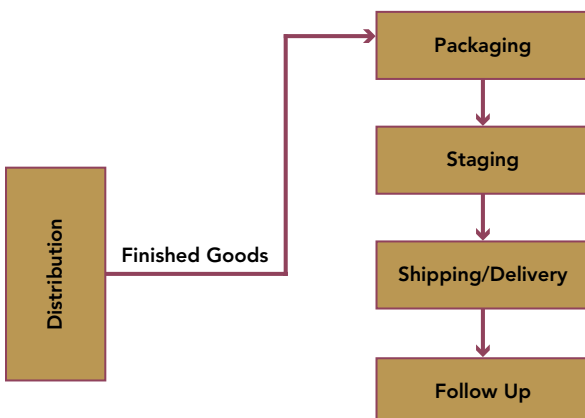
• Customer information flow. This was a major concern voiced by almost every participant. Frequently customers do not provide shipping requirements when the print order is placed, thus forcing the print services provider to hold finished goods once printing and finishing is complete.

• Fuel surcharges. Most participants indicate that their shipping has been increased 10–15% due to a surcharge from transporters.

Future Trends

The research participants anticipated that the following top ten trends will affect their distribution operations in the near future:

Figure 3. Summary distribution workflow

printer, indicated that over 90% of the company's product had to be shipped to the customers' manufacturing plants in China.

Distribution *continued*

- Advancement in technology. Most of the participants remarked on the development of better tracking and inventory management devices.
- Offsite storage. More printers are looking at offsite storage options.
- Customer relationships. Participants see that a strong relationship with customers and the ability to satisfy their needs will differentiate one printer from another.
- Electronic flow of information.
- Print-on-demand.
- Rising postal rates and fuel and freight costs. This trend is a burden for many print services providers, although some participants said that they pass on these costs to customers.
- Distribution as a profit center. This new trend is a break with traditional printing industry mindsets.
- Partnerships with the postal service.
- Variable data printing.
- Offshoring. One of the survey participants, a textile packaging

Conclusion

Increasingly more printers are bringing distribution services in-house. This trend is being driven by customer demand and the need to redefine business models. It is not something that has been limited to large commercial printers. Small printing companies and digital printers are getting on the bandwagon. Another key objective is to shorten the supply chain.

Printers need to embrace future trends and address issues that impact profitability and can reduce costs. Offering services like distribution is a great opportunity for differentiation. Print has become a commodity. The industry has been redefined and will not be going back to its former way of doing business. ◖

Figure 4. Basic distribution workflow
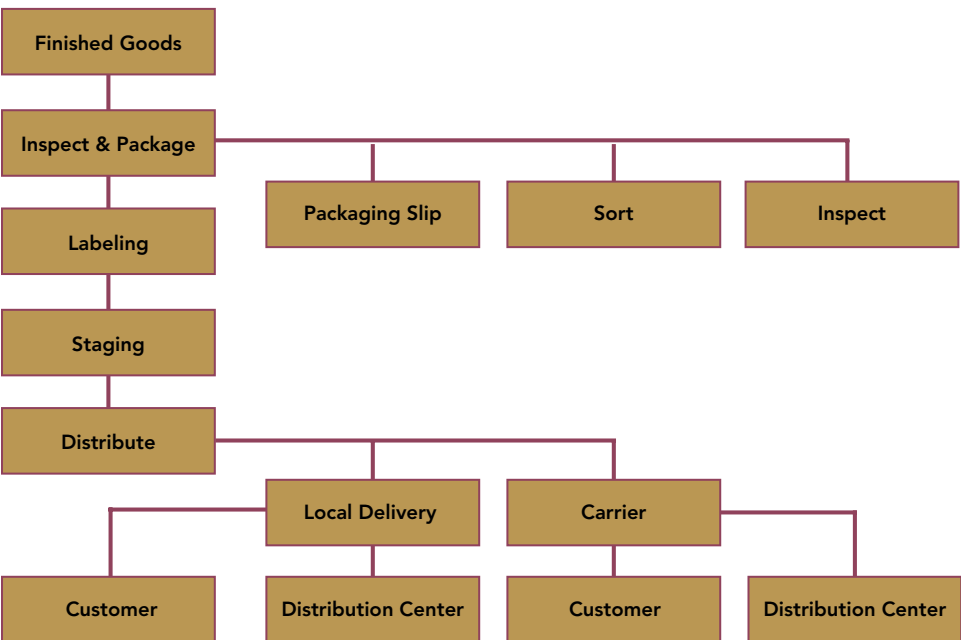
Figure 5. Sophisticated distribution workflow

| Finished Goods |
| Sort & Inspect | → Shipping Request | Packaging Instructions |
| Packaged |
| Warehouse | → For JIT Delivery |
| Distribution List | → Individually Packaged | Bulk |
| Quality Control |
Sort & Label	Destination (e.g. retail store)
Delivery	Customer Distribution Center	→ End Users
	USPS (434 Facilities)	→ End Users
Printer's Truck
Customer's Transportation	Commercial Trucks
Follow Up
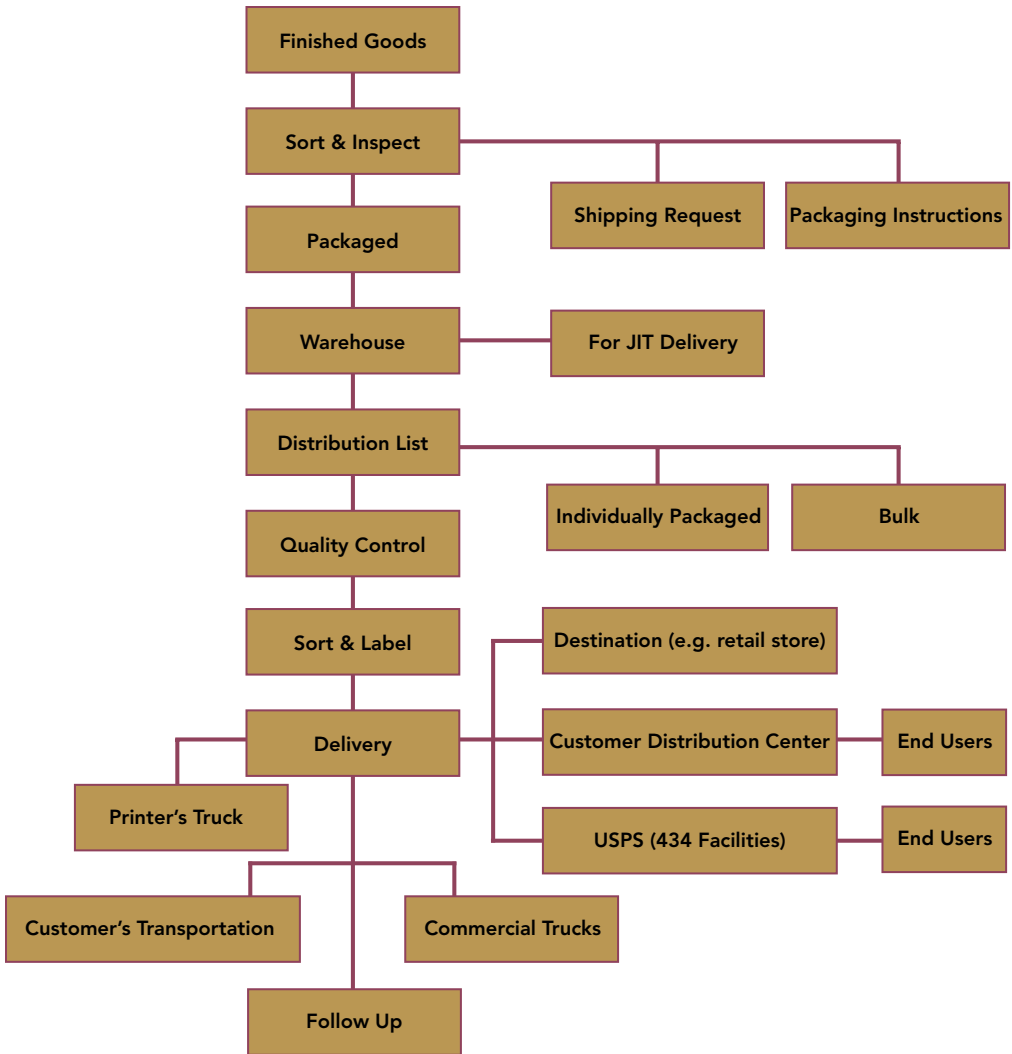
E-commerce *continued*

But are print services providers taking advantage of this opportunity? The new research study was undertaken to with the primary objectives of:

- Understanding how print services providers define e-commerce,
- Understanding who benefits from e-commerce services: the printer, the customer, and/or the end user/reader of printed materials, and
- Exploring how printing companies are utilizing e-commerce in their business strategies.

How E-Commerce is Defined

The study found that the definition of e-commerce depended on each company's target market. All participants agreed, however, that e-commerce involves transactions over the Internet. But half of the companies that responded indicated that their level of awareness of e-commerce in printing was severely limited; they basically looked at the Internet as a means of allowing customers to order and view inventory online. The greater value of Internet-based transactions will be realized by companies that take advantage of all three of the basic functions that concern their customers: file creation and manipulation, ordering, and monitoring orders. (See Figure 1.)

E-Commerce *continued*

Who Benefits from E-Commerce

When asked who benefits from e-commerce operations, three-fourths of the respondents said that everybody did. The printer benefits first because customers will perceive that a company that offers these value-added services is efficient and modern. E-commerce systems also eliminate price negotiations because Web-based transactions most likely use a fixed-cost model. Customers enjoy the convenience and ease of use offered by e-commerce. Sending files electronically to a print services provider and viewing proofs electronically can save a considerable amount of time. Even mobile professionals can transfer information more efficiently and access a wider selection of services. End users enjoy the savings passed on from customers, and receive faster service because of e-commerce. Ultimately the end-user will obtain the products they order regardless of how they were ordered.

An e-commerce system is effective in reducing overhead and distribution costs. Since the customer inputs most of the information, the level of accuracy is higher than if the same information
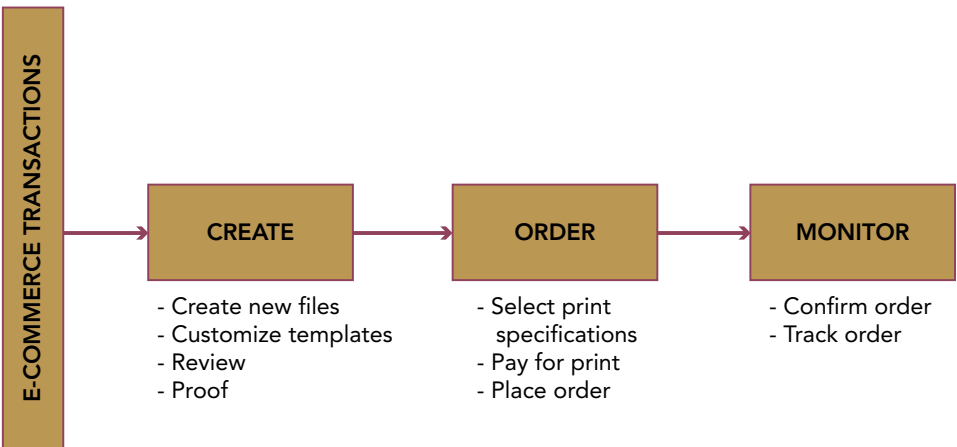
had to pass through various filters. Also, there is less administrative work on the printer's side. Thus the concern has been raised that a true e-commerce system may result in reducing the number of employees in a company.

How E-Commerce is Being Used

Most of the respondents in this research are not utilizing the full capabilities of e-commerce. At the time of this survey, none of the respondents were implementing a total e-commerce solution that encompassed all the steps from design and file creation to inventory tracking, ordering, and fulfillment monitoring. Most participants were implementing some form of e-commerce, however, mainly with an ordering system. It must be noted that the sample for this research, 16 companies, was a limitation to the study; the findings may not necessarily represent the entire industry.

It can safely be assumed that customer demand for total e-commerce solutions is currently low. Also, the barriers to entry to Internet-based print solutions, specifically cost and employee training, may also be contributing factors. But these barriers may vanish, and soon. In a 2004 NAPL study, 37% of participants mentioned e-commerce capabilities as an investment priority over the next five years, compared to only 18.8% doing so the previous five years.

Figure 1. Print e-commerce transactions

E-COMMERCE TRANSACTIONS

CREATE	ORDER	MONITOR
- Create new files - Customize templates - Review - Proof	- Select print specifications - Pay for print - Place order	- Confirm order - Track order

Conclusion

Whatever the current usage of e-commerce technology in the printing industry, it is fairly obvious that the future of print lies in Web-based solutions, taking advantage of the merging of Internet and print technologies to give customers personalized and speedy results. Print services providers would do well, therefore, to embrace the Internet and use it to redefine their operations. ◐

[1] Sherburne, Cary. (2005, February). The print e-commerce market, Part 1. Retrieved June13, 2005 from http://members.whattheythink.com/specialreports/050228sherburne.cfm.

[2] Core, Erin. (2003, September). Caught up in the web [Electronic version]. *Graphic Arts Monthly*. Retrieved March 31, 2006 from http://gammag.com/BackIssues/index.php?art=0309fe.

To read about this research in detail, download the monograph from: http://print.rit.edu/pubs/picrm200504.pdf

Premedia *continued*

print production. Industry professionals on both sides of this workflow benefit when the communication of specifications and expectations are clear and easy to understand.

The survey data collected indicated that, based largely on the different strengths of creative and technical service professionals, the approaches of each population to specific color management-related tools and workflows resulted in a high potential for color variability. Most creative professionals in this study take a "hands-off" approach to color management, leaving final color adjustments and proofing to the premedia and print services providers that follow them in the production sequence.

Creative Services Providers

Creative professionals use a variety of tools and techniques during the early stages of production and, because their emphasis is on creating good design, specific technical considerations are often de-emphasized in favor of more aesthetic considerations. For final color decisions, nearly all the participating design firms openly expressed a reliance on the expertise of the prepress professionals that receive their files to make corrections as necessary. Most also stated that they had a short list of preferred print services providers that they relied on regularly.

Several designers noted that they routinely rebuild digital work received from an art director, often from the ground up. This trade practice may seem redundant, but it actually illustrates the critical balance of the creative and technical components that are needed for successful file generation. The technical components that most influence color reproduction include:
- the setting of color preferences in specific software applications,
- the synchronization of color preferences between applications, and
- the handling of color profiles for images and layout files.

Nearly all creative participants surveyed left the color preferences ("settings") for each specific software applications at the manufacturer's default. The new Adobe Creative Suite
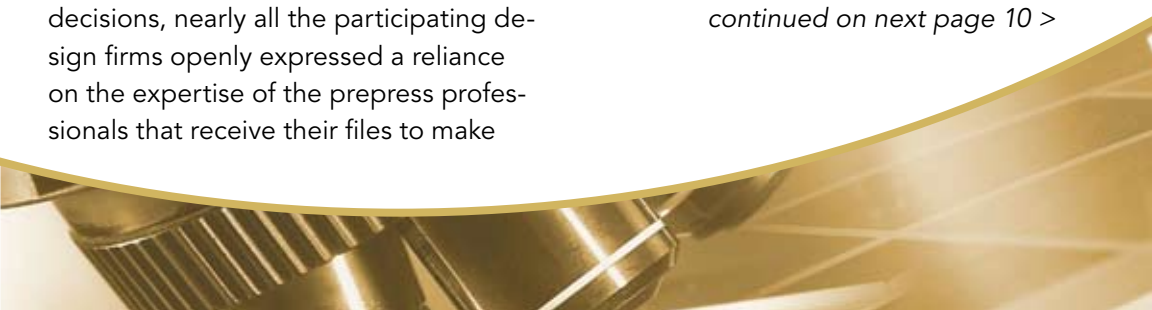
Premedia *continued*

(CS) 2, introduced during the period of time this research was conducted, provides a common default using sRGB and SWOP CMYK as preferences for all Adobe applications. Files created under this default, however, may have marked differences from files created using the North American Prepress default (formerly called the U.S. Prepress Defaults), which uses the broader gamut AdobeRGB, the RGB space endorsed by the International Prepress Association and the default for the current version of QuarkXPress.

The selection of these color settings influences both the rendering of specific colors in an image file and the operator's handling of existing embedded files. For example, opening an image file with an AdobeRGB profile embedded from Photoshop would result in a window warning of a profile "mismatch," and asking the operator whether to preserve, convert, or discard the profile. On the other hand, opening an image file created using Adobe CS2 defaults would leave the embedded profile preserved without any operator interaction or choice.

A slight majority of creative participants indicated that they preferred to work in CMYK (over RGB) for print work. Many of those preferring RGB converted their files to CMYK prior to sending them out to a prepress or print services provider. However, there is a lack of clear standards for handling RGB profiles, and a conversion from two dif-ferent RGBs to the same CMYK profile will give different results. So, although all files may be embedded with the SWOP CMYK profile, they may still vary in the amount and type of color correction necessary to compensate for earlier decisions relating to the RGB profiles.

There was an overall agreement that accurate proofing was generally lacking, forcing creative firms to rely on the print services provider to generate color-accurate proofs. All firms expressed an interest in better low-cost proofing alternatives, particularly soft-proofing options.

Providers of Premedia and Print Production Services

The nature of the premedia function is to prepare files for output; the slogan of one printer's premedia department was: "Anything you want to throw at us—we will make it work!" Premedia professionals see their role of file and color correction specialists as critical to their business, regardless of whether they explicitly charge for the service or not.

The most common file issues that premedia professionals see involve:
• mixing of RGB and CMYK files,
• insufficient resolution,
• no bleeds (typical on PDFs), and
• issues with the use of spot color.

Most of the premedia services providers in this study customize the color preference settings in their software to better match industry trade standards and/or in-house specifications. The specific RGB and CMYK color profiles they set determine the numeric values used for color correction and color specification within software. For example, within Photoshop, selecting AdobeRGB instead of sRGB as a default will result in variance of the CMYK numbers that appear in the Info Palette and Color Picker. Since 100% of the premedia services providers polled indicated that they do color correction "by the numbers," the deviation by varying profiles can be significant.

Table 1. Difference from assigning sRGB profile

	ΔL*	Δa*	Δb*	ΔC	ΔE*oo
Orange #7	-3.0	-9.0	-9.0	-12.17	4.76
Blue #13	1.0	-1.0	0.0	-0.32	1.01
Green #14	1.0	12.0	-1.0	-9.22	5.09
Red #15	-5.0	-9.0	-38.0	-29.64	16.78
Cyan #18	2.0	12.0	4.0	10.63	6.13
Neutral #20	0.0	0.0	0.0	0.0	0.0
Neutral #22	0.0	0.0	0.0	0.0	0.0

Table 2. Pantone 165C (orange) measurements (RIT orange)

	L*	a*	b*	ΔC	ΔE*oo
Reference	41.0	44.0	48.0	–	–
AdobeRGB Photoshop	41.0	44.0	48.0	0.00	0.00
Default Photoshop	41.0	44.0	48.0	0.00	0.00
AdobeRGB Illustrator	49.0	60.0	64.0	22.61	9.14
Default Illustrator	53.0	32.0	38.0	5.68	27.13
AdobeRGB InDesign	50.0	34.0	54.0	0.34	10.28
Default InDesign	49.0	34.0	55.0	-0.45	10.67
QuarkXPress	44.0	58.0	56.0	15.51	5.21

Table 3. Pantone 1675C (burnt umber) measurements (RIT brown)

	L*	a*	b*	ΔC	ΔE*oo
Reference	63.0	61.0	75.0	–	–
AdobeRGB Photoshop	63.0	61.0	75.0	0.00	0.00
Default Photoshop	62.0	60.0	72.0	-2.95	1.18
AdobeRGB Illustrator	69.0	67.0	82.0	9.22	5.15
Default Illustrator	68.0	37.0	54.0	-31.21	8.68
AdobeRGB InDesign	67.0	40.0	66.0	-19.50	8.32
Default InDesign	67.0	33.0	68.0	-21.09	12.20
QuarkXPress	66.0	77.0	81.0	15.08	5.37

A surprisingly large percentage of premedia participants noted that they routinely discard embedded profiles of incoming image files. These participants were quick to explain that they do so because most of their customers do not understand color management, and the profiles embedded are often embedded in error or without the customers' knowledge. They maintained that the files are just as easy or easier to correct under these conditions.

In terms of RGB versus CMYK workflows, most premedia participants said they routinely accept both file types but generally prefer CMYK. For files that are already converted to CMYK by customers, participants were split as to whether they converte the existing CMYK (assumed to be SWOP CMYK) to the specific press CMYK profile, or discard the embedded profile in favor of reassigning the image file to their preferred CMYK. The difference in these two practices can result in a significant variation in the resulting output.

Technical Analysis of Color Differences

Based on the variations in color workflow cited from the data collected, a series of tests were conducted to quantify the visual impact of the various specific color workflows. Using an L*a*b* version of the MacBeth ColorChecker as the original, a series of tests were conducted where files were converted to specific RGB and CMYK profiles and then converted and/or reassigned to other RGB and CMYK profiles. The color variation that resulted was tabulated to derive the relative color difference (expressed as ΔE^*oo).

The analysis showed that many generally accepted trade practices, observed during the study, produced very significant visual and measured variance in the resulting color reproductions. The trade practice of converting all files to a common working space gained credence as the tone and color of the pictorial files converted from the larger AdobeRGB gamut down to the smaller sRGB gamut remained nearly identical in appearance to the AdobeRGB-based reference.

In contrast, the color shift observed by discarding embedded profiles at the image editing stage was significant. (See Table 1.)

The magnitude of variation when converting from different RGB profiles to the same CMYK profile can be seen in Tables 2 and 3.

Spot-to-process conversions done in different software applications or under different color settings produced more variations. While the impact of these variations will significantly impact CMYK proofing and CMYK-only output systems, the variations will also affect color communication and the color expectations of customers who view them in any form.

Conclusions

The study verifies that there are both great discrepancies in "acceptable" workflow practices among professionals in premedia services and, by extension, great opportunities for improved efficiencies. A more comprehensive study that analyzes specific groups based on market applications would be required to obtain a more meaningful analysis of trends and opportunities by market.
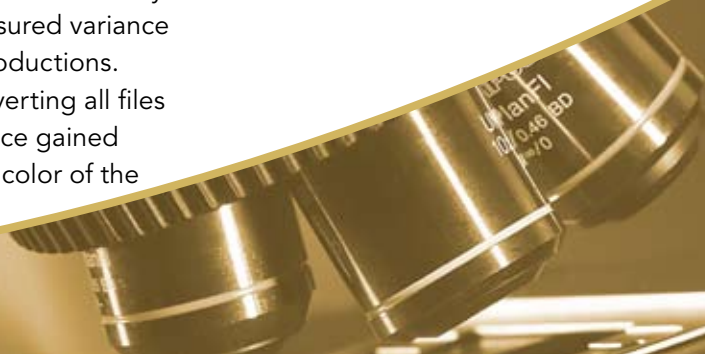
About the Center

Rochester Institute of Technology (RIT) was selected by the Alfred P. Sloan Foundation in 2001 to join the family of Sloan Industry Centers located at prestigious universities across the U.S. The Printing Industry Center at RIT is a joint program of the School of Print Media and RIT's College of Business, emphasizing Sloan's long-standing tradition of applying a broad multidisciplinary approach to industry investigations and findings.

Dedicated to the study of major business environment influences in the printing industry brought on by new technologies and societal changes, the Printing Industry Center at RIT addresses the concerns of the printing industry through educational outreach, research initiatives, and print evaluation services. The Center creates a forum for printing companies and associations worldwide to access a neutral platform for the dissemination of knowledge that can be trusted by the industry, to share ideas, and to build the partnerships needed to sustain growth and profitability in a rapidly changing market.

With the support of RIT, the Alfred P. Sloan Foundation, and our Industry Partners, it is our mission to continue to develop and articulate the knowledge necessary for the long-term economic health of the printing industry.

More information on the Printing Industry Center at RIT and its research activities can be found online at http://print.rit.edu.

Industry Partners

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