



2009-2010 Research Proposal—New Initiative

Revision of “An Investigation Into Printing Industry Demographics”

Principal Investigators

Frank Romano, Professor Emeritus, School of Print Media, RIT

Statement of Problem and Research Objectives

What is the printing industry? The goal of this study is to update the 2003 study that defined the printing industry universe. There are about a dozen major sources of information about the printing industry, only one of which is the Federal Government. Although printing is one of the most documented industries in the United States, source arrives at a different view for the size and scope of the industry. This report investigates the challenges in developing a meaningful set of criteria for defining and quantifying the printing industry based on the 2003 report. Using the criteria from over 15 points of definition, all relevant data sources will be reviewed. The goal is to understand the demographics of all services that reproduce information on paper.

There are two aspects that define a printing service:

1. Some level of quantity is produced, which would eliminate home and occasional copying/printing.
2. Print is both a product and a service.

The “print for pay” requirement has excluded in-plant (not-for-pay) operations, even though some of them “sell” their printing production to departments within their company through a chargeback system.

Newspapers own presses, but usually only print for themselves. However, some of them provide commercial printing services. When they print for themselves, they record all print manufacturing costs. Those costs should be represented in the revenue base for the printing industry.

Pre-press businesses now have digital printers for short run jobs. Do we count the entire firm or only that portion devoted to print? We have always counted pre-press revenue in printing company results, why wouldn't we count pre-press and printing revenue in pre-press company results?

We contend that any entity, individual, or company, that produces reproduced material in quantity and charges for it in any manner should be considered in the demographics of the printing industry.

The installed base of reproduction equipment will change over the next decade, as it did from 1960 to 1980 when offset replaced letterpress and phototypesetting replaced hot metal type. To exclude segments of the equipment population skews all projections. Copiers have been replaced by digital printers. Digital printers have replaced offset presses, just as offset presses replaced letterpress presses.

Copying Services

Copy shops do not own printing presses. Their services include blueprinting, business services, copying, document duplicating, photocopying, wide format printing, and reprographic services. Copy shops and business services that produce volume reproduction services should be counted but “occasional” or “walk-up” copier locations should not be included because they usually are not producing “quantity.”

The digital duplicator (high-speed copier) in the early 1990s had a profound effect on both the copying market and the offset duplicator market. Within only a few years, digital printing has replaced certain classes of copiers and low-end offset presses. The first users of digital printing were desktop service bureaus; the first users of digital color printing were pre-press services. We think that any commercial reproduction service with copiers or printers rather than presses counts. We also have to consider office supply retailers such as Staples, Office Depot, and OfficeMax which have expanded in-store reproduction services.

We must note that the copier and digital printer world are merging. All new copiers are digital printers with scanners, or MFPs. This makes the device multi-functional in that it can accept either hard copy pages or digital files. Today, digital printing is a substitute for offset lithography just as offset litho was a substitute for letterpress. We contend that any entity that sells digital printing and digital copying should be counted. Firms that only have digital printing should absolutely be counted because they will upgrade their equipment, just as small printers with offset duplicators upgraded to bigger and faster offset presses.

Packaging Printing

Packaging printers print on paper, board, and plastic/film materials. Packaging and labels represent about 16 percent of the revenue of so-called commercial printers. Commercial printers count the revenue from packaging if they print packaging, but packaging printers are not often counted in printing industry statistics. The confusion may come in the difference between a packaging printer and a converter. A converter takes a raw substrate, like board, and converts it into cartons. Or takes rolls of aluminum and makes cans. In the process they print color, code numbers, and other information on the carton or can or package. Over the last decade much of the growth in packaging has been in flexible packaging, folding cartons, and labels and wrappers.

Specialty Printers

One must separate printers that sell a service from those who are part of a company’s manufacturing process. Products printed or decorated include decalcomania, printed circuits, bank notes and securities, currency, postage stamps, security printing, trading stamps, cigarette filter tips, playing cards, fine art reproductions, imitation veneers, floor coverings, decorative laminates, wall coverings, plastic cards, tablecloths, shower curtains, games, lottery tickets, gift wraps, napkins, place mats, paper plates and cups. Many commercial printers print on plastic substrates, or on special papers that are then laminated. Thus, we should count specialty or decorative printing firms. Some inkjet flatbed printers can now print on sheets of thick plastic. We include those specialty products that are printed on paper or plastic in full color.

Screen printers

Screen printers print on textiles and wood and other unusual substrates. Wide-format printing is beginning to compete with screen printing for signage, but many screen printers print apparel and manufacturing components. Screen printing is used for applications which cannot be handled by offset, gravure, or flexography. Applications with substrates such as cloth, wood or rigid plastic are primarily printed with screen printing because of the flexibility of the screen. Inkjet printing may be a potential fit because of the similar substrate flexibility in at least some current screen-printing applications. Screen printing is described as an invisible industry. Screen print providers tend to be small proprietorships, and

most of the capacity in organizations is not identified as screen printers—a textile factory or a company that makes printed circuit boards. Applications are specialized and the industry is highly fragmented -- automotive and transportation furnishings, textiles, displays, wide format applications, and flatbed industrial printing.

Newspapers

Almost all daily newspapers own their own press or presses. Most weeklies are printed on presses owned by dailies or commercial services, some of which are not involved in newspaper publishing. The challenge is placing a value on the printing that is done when printing the newspaper may be integrated with the publishing operation. A majority of North American newspapers with presses now provide “commercial” printing services (67 percent). They print other newspapers than their own, as well as newsprint magazines, ad circulars, or other materials. We contend that newspapers should be counted—both their internal manufacturing cost and their commercial services revenue.

What is the Difference Between a Small Printer, Copy Shop, and a Quick Printer?

”Small printer” can mean the firm has a reproduction device (duplicator) that is 2-up or less. Press size has traditionally been an indicator of a firm’s capability, which is why many printers define themselves by their press. One very large commercial printer claimed that they were a quick printer even though they had almost 500 employees, but with many small presses. There is an overlap of 50 percent or better between each segment.

The term “instant printer” or “quick printer” arose in the 1960s as the camera-platemaker and the offset duplicator allowed printers to offer while-you-wait services. These firms evolved into black-and-white and color copying as well and split into two markets: franchise and independent companies. In some parts of Europe, handset type and letterpress printing were considered “quick” printing processes. We tend to think of quick printers as relying on walk-in customers for the bulk of their business. As part of their changing business strategy, they are pursuing corporate business instead of waiting for the customer to walk through the door. Quick printers aren’t necessarily quick -- their typical turnaround for jobs is longer than 24 hours.

Quick printers are now involved with pick-and-pack, kitting, fulfillment, mailing, and other post-printing services. Corporate customers are also ordering posters, trade show exhibits and other point-of-purchase products. They need fast turnaround and usually provide the digital file to the output provider. Therefore, the quick printer essentially functions as an output service provider -- producing the POP media and mounting or laminating the output.

Quick printers are usually considered to be franchises. The franchise segment of the quick printing industry continues to contract. FedEx Kinkos is not a franchise, but its local stores are copy shops or quick printers. Quick printing is short-run, quick-turnaround commercial printing and copying. Offset printing accounts only 22 percent of all sales, and copying/digital printing makes up the balance.

We also find that the definition of small depends on many factors. The line is blurring between copy shop, quick printer, and commercial printer and that present definitions are less and less helpful.

In-plant Operations

There are two aspects to this area:

1. Corporate and governmental related—companies/governmental agencies that produce materials for inhouse use

- » In-plant printing operation
- » Central reproduction department
- » MIS/IT

2. Publishing related—companies that produce materials for outside sale

- » Periodicals
- » Newspapers
- » Periodicals
- » Greeting cards
- » Other

The corporate market consists of hospitals, financial services, retailers, manufacturers, and governmental agencies, utilities, and other corporate entities that require paper-based reproduction. The challenge arises from the definition of in-plant printing facility. The accepted definition is that there is at least one press and a dedicated operator. There are a very large number of Centralized Reproduction Departments in companies with copiers and digital printers — but no press.

Within the company, there may be one or more centralized services for copying, digital printing, and other support services. Lastly, there is the MIS/IT department which may have roll-fed digital printers for transaction documents. It may be that these three areas are integrated, or, in many cases, they may not be. In some cases, the company outsources the work, but the facility is on company property. To exacerbate the definitional problem, some in-plant operations sell printing or copying to other companies.

Data centers within MIS or IT departments utilize digital printing. As the trans/promo market evolves, the usual bill or statement will morph into a promotional piece. The most interesting aspect to the in-plant market is the assignment of a value to what they produce. Some analysts assume a value based on the commercial market. We contend that using the department budget (cost) is a more realistic approach to developing a revenue number.

Multi-national Firms

Many of the world’s largest printers are multi-national companies. Some are based overseas and have a very large presence in other countries. Some very large U.S.-based printers own companies and facilities in other countries. An increasing number of U.S. printers are establishing facilities or partnering with Asian companies. Their revenue represents a worldwide revenue. Other anomalies are the volume of printing that moves across NAFTA borders and printers with foreign subsidiaries. Breaking international revenue from the total revenue of these firms was a challenge.

The Bottom Line

We are seeing the growth of smaller shops who enter the market with digital printing only.

After WWII offset lithography was responsible for the largest growth in printing ever. Small printers sprouted up everywhere with used Multis and used AB Dick 360s. I contend that AB Dick never made a new 360 because almost all of us started with a used 360. The manufactured used presses. I contend that this is actually occurring today -- if you accept the fact that copy shops are printers. I remember when letterpress printers said that offset printers were not printers. Copy shops are adopting digital page and wide format printing. Sign shops are more and more digital.

These are mostly small shops and they are everywhere. In Vietnam, there are only 1,000 printers but thousands of "photocopy" and photo finishing shops. Many were using digital printing.

If we re-counted industry firms under these definitions, we would see that we may be growing in the number of establishments, even as there is a decline in the number of currently-defined printers. Revenue growth is a different story. The NAICS system segregates copy shops and sign shops as well as quick printers.

Methodology

Review all sources of information on industry quantification, including:

1. Yellow Pages -- weed through brokers and sales office listings
2. State industrial directories
3. AF Lewis Blue Book listings
4. Barnes database
5. Credit rating agency lists
6. Supplier databases
7. NAICS data
8. Association information
9. Surveys of representative lists

The final result is expected to be a proposed re-definition of the printing industry with possible scenarios for qualification and quantification. This report will only update the 2003 report and not investigate printing trends or practices.



2009-2010 Research Proposal—Continuing Initiative

Test Targets 9.0

Principal Investigators

Robert Chung, Gravure Research Professor, School of Print Media, RIT

Statement of Problem and Research Objectives

Test Targets, published annually by the School of Print Media since 2002, is the result of teaching and learning in the areas of printing process control and color management from the SPM undergraduate and graduate curricula. RIT personnel (students, faculty, and staff) work together with Printing Industry Center Industry Partners to create content and manage digital assets for publication in a book format (also published digitally as a PDF).

Test Targets 8.0, published in November 2008, was made possible through the financial support of the Printing Industry Center. Specifically, a co-op student was hired to help coordinate many aspects of the publishing and communication tasks in summer quarter and in fall quarter. More press time was made possible to conduct metallic and spot color printing experiments.

The 2008-9 proposal is a continuation of the *Test Targets* journey with the goal of (1) publishing *Test Targets 9.0* to demonstrate scholarship within the field of color management applications, (2) achieving wider circulation of the publication, and (3) creating video segments that capture the ideas and activities behind the making of a publication.

Method

1. Work with the Executive Committee to develop a budget and a timetable for *Test Targets 9.0*, including major expenses, research agenda, content creation, print production, and distribution.
2. Work with the Steering Committee to prepare students in the Advanced Color Management class to become authors of the publication.
3. Work with Printing Industry Center Industry Partners to solicit possible topics and to serve on the technical review panel.
4. Interact with technology partners to solicit hardware, software, and consumable suppliers for printing-related donations.
5. Work with School of Design faculty to create cover design and document layout.



2009-2010 Research Proposal—New Initiative

Evaluating the Viability and Usefulness of a Distribution Center for Commercial and Newspaper Printers

Principal Investigators

Twyla J. Cummings, Ph.D., Paul & Louise Miller Distinguished Professor, School of Print Media, RIT

Statement of Problem and Research Objectives

The need to differentiate one print services provider from another is not only based on products or technology, but also on the unique value of the provider as perceived by the customer. The benefit to the customer is in having one supplier responsible for managing both print and distribution, while the value to the print services provider is a continuous and steady flow of work. Furthermore, many value-added services are a natural extension to or can be integrated with distribution, such as fulfillment, warehouse management and facilities management.

One way to ensure that distribution services are adding value to an operation and its customers is to have an internal infrastructure that can adequately support the goals and objectives of the company. One approach is to establish a formal distribution center that encompasses many functional departments. Figure 1 (on the next page) illustrates the wide range of value-added activities that could be offered in a distribution center structure. Some key activities include:

- Fulfillment: Kitting, pick and pack, just-in-time (JIT) printing.
- Mailing Operations: Addressing and bar coding with a mailing specialist providing a USPS interface.
- Product Returns: Receiving, inspecting, restocking, reshipping, and security.
- Storage: Warehousing of customers' raw materials, finished goods, work-in-process (to be completed on demand), and other items. Each item should carry an in and out charge as well as a monthly charge.
- Inventory Management: List maintenance, IT management, report generation, and billing.
- Shipping: A logistics function involving rate negotiation, product tracking, and filing claims.
- Packaging: Preparation of product for shipment, and, in some cases, working with design and structural engineers before the product is manufactured to ensure appropriate packaging options.
- Quality Assurance and Inspection: Monitoring checklists and auditing shipments.
- Document Destruction and Recycling: A chargeable service involving the disposal of classified and expired documents.

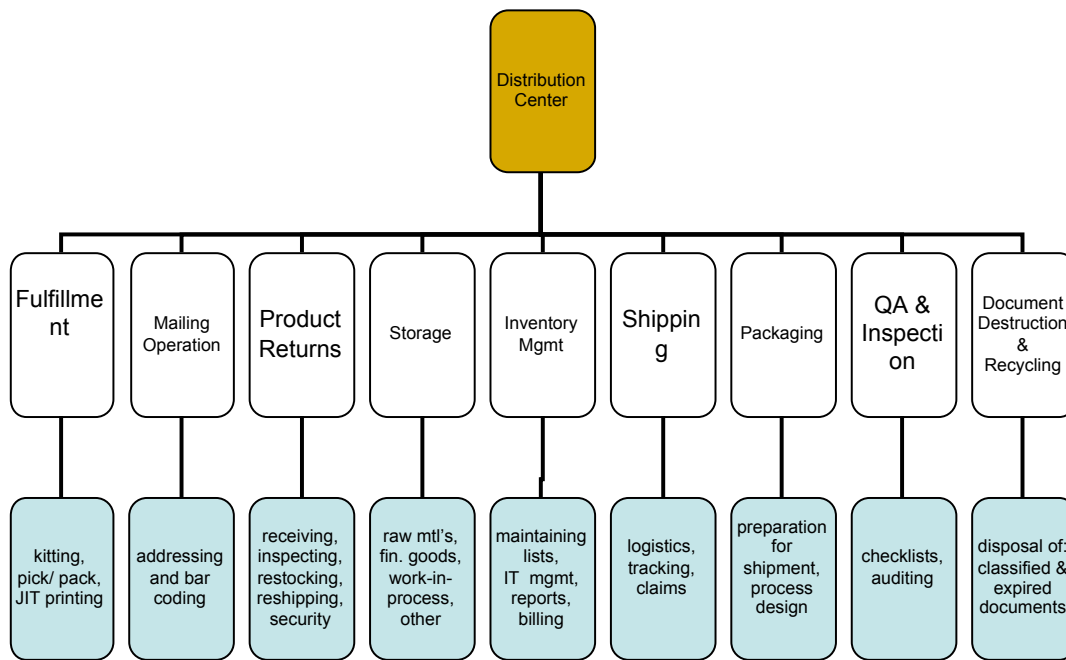


Figure 1. Proposed Distribution Center

The primary objectives of this research are:

1. To introduce the distribution center concept to a select number of print service providers. This will cover physical as well as e-distribution centers.
2. To determine if print service providers are offering any or all of the services outlined in the proposed distribution center model. If so, where are they offered in the company and how are they structured? Are they managed in an organization similar to Figure 1?
3. To test the validity and viability of the model.

Method

The following methods will be used to achieve the defined research objectives:

1. Identify a list (sample size TBD) of print service providers from the commercial, digital, packaging and newspaper publishing sector. [Note: digital printers will provide insight on how front-end services interplay with distribution]. It is anticipated that the sample population will be representative of companies that currently provide multiple distribution services, those that offer very few and those that outsource.
2. Develop appropriate interview questions.
3. Set up face to face interviews.
4. Evaluate research results.
5. Complete research monograph.



2009-2010 Research Proposal—New Initiative

A Qualitative Study of High Value News Media Audiences

Principal Investigators

Howard Vogl, M.S., Visiting Professor, School of Print Media, RIT

Statement of Problem and Research Objectives

Considerable quantitative research has been done on news media audiences. However, there is a lack of deep understanding of the portion of the audience that, in the near future, will be of high value to newspaper organizations and their advertisers.

A high value component of the future news media audience is college students. They have above average education levels, which will correspond to above average income and more discretionary spending. Therefore, the goal of this research is to conduct a qualitative analysis of this high value component of the news media audience.

The objectives of this research are:

1. To gain a deeper understanding of the news media usage habits of a select high-value group of users.
2. To detect new usage patterns that would be valuable to news media organizations and their supporting businesses.
3. To confirm or deny current assumptions about the media usage habits of this group.

Method

The following methods will be used to achieve the stated research objectives.

1. Conduct in-depth secondary research.
2. Collect data on current news media consumption habits.
3. Develop limited scenarios describing how news media might be distributed in the future.
4. Based on these scenarios conduct interviews with focus groups from selected colleges. Then, record and transcribe the results.
5. Code and categorize results for analysis.
6. Present both textual and graphical models of findings.



2009-2010 Research Proposal—New Initiative

Content Management for Consumer Photography

Principal Investigators

Franziska Frey, Ph.D., McGhee Distinguished Professor, School of Print Media, RIT

Statement of Problem and Research Objectives

Content management is one of the new frontiers in consumer photography. While less and less people print their images at the moment they take them, the digital files are kept for future use. How these images are used depends on whether consumers can find and access them later on - hence how successful their content management strategy is. Newer technologies like facial recognition and automatic tagging, just to mention a few, will further support the consumers' efforts to find certain photographs. If companies want to be able to monetize consumer photographers' digital assets they need to understand how content management is used by the consumer. A successful strategy to move digital images into products - printed and digital - will have to combine the consumer's desire to keep their memories with new and easy workflow solutions to create these products.

Specific research objectives and questions include:

- Understanding the use of content management for consumer photography.
- What has changed for the consumer with the shift to digital?
- What is the importance of permanence in a digital world?
- What infrastructure needs are being posed to consumer photographers by the use of content management?
- What are the technical problems that still need to be solved to make content management work effectively for consumers? This also includes taking a close look at the standards needed to make content management work.
- What are the business models for content management for consumers?
- What are the workflow models to incorporate content management into the consumer photographer's workflow? How are these workflow models different from the workflow models professional photographers are using?

Method

A thorough literature review will be conducted in a first period of the project. Additionally interviews with consumer photographers will be conducted to get a more complete picture of the current state of the art. Along with the interviews, a focus group will be established for a continued in-depth dialogue of certain issues. Additionally, an experiment will be conducted to investigate

whether consumers prefer photographs that are personally very important to them to be printed rather than looked at on a monitor. For this experiment, the test persons will be shown pictures they provide alongside reference pictures on a monitor and in print. Several parameters will be measured, e.g., time spent looking at either image and willingness to spend money to own the print. The outcome of this study will build the basis for a survey in year two.



2009-2010 Research Proposal—New Initiative

A Survey into Metrics and Methods Employed by the Printing Industry to Measure, Track and Integrate Sustainability into Their Business Practices: Phase I

Principal Investigators

Sandra Rothenberg, Ph.D., Associate Professor, E. Philip Saunders College of Business, RIT

Marcos Esterman, Assistant Professor, Industrial and Systems Engineering, Kate Gleason College of Engineering, RIT

Statement of Problem and Research Objective

The print industry is currently coming to terms with what it means to be more sustainable. It is widely recognized that energy consumption, paper consumption as well as environmental emissions need to be reduced. A consistent request that the principal investigators (PIs) have been fielding has been to help develop standardized sustainability assessments that would allow the comparison of different printing technologies, printing platforms, printing products and printing value chains. The issues that need to be addressed in order to accomplish these assessments is that (1) a set of metrics needs to be agreed upon and developed that would allow this comparison to be made; (2) the appropriate data acquisition and analysis methods would also need to be developed so that there is consistency between comparisons; (3) the appropriate sensing instrumentation would need to be identified along with the proper methods to install this hardware would also have to be developed.

The goal of this research is to perform a survey into metrics and methods employed by the printing industry to measure, track and integrate sustainability into their business practices. In addition, it is also recognized by the PIs that a great deal of work has been conducted in this area by the print industry, but that a proper inventory of the current state of the art is lacking. Therefore, the focus of this proposal is to define the research roadmap that will be required to develop this inventory and execute the first phase of that inventory. In addition to the inherent value of just the described service, this work would serve as the foundation for the future development of a printing value chain test-bed envisioned by the PIs.

Method

The ultimate scope of this work would need to include the entire print value chain. However, it is recognized by the PIs that the scope of such a survey would be larger than the available resources in the timeframe of this proposal. Nevertheless, the starting point of this work would be to develop the research roadmap that would be required in order to perform a comprehensive survey of the print industry. From this roadmap, the first phase of the research would be scoped in order to complete the first phase in 2009. The main issue that needs to be addressed in Phase I is scoping the survey to focus the appropriate portion of the print value chain. It is likely, that the initial focus would be on the print equipment manufacturers.

– Continued –

Once the appropriate population has been identified, a combination of methods will be used that will include literature reviews, the review of past surveys, new surveys and augmentation of the surveys with follow-up interviews and case studies, if appropriate. A case study that is planned in support of this work is a case study on the green office space. This would involve a study of an office involved in an effort to become "green". This case study would provide insight into the benefits and challenges in implementing print service systems.

Research Deliverables:

- 1) A research roadmap for surveying sustainability assessment metrics and methods in the print industry.
- 2) A comprehensive literature review of sustainability metrics and measurement methods.
- 3) A survey of sustainability performance measurement systems of key players in the print value chain.
- 4) A case study on the green office space.



2009-2010 Research Proposal—New Initiative

An Experimental Investigation of Presentation Medium-Dependent Differences in Image-Intensive Content Consumption Habits, Retention, and Valuation

Principal Investigators

Frank Cost, Associate Dean and Professor, College of Imaging Arts and Sciences, RIT

Javier Rodriguez Borlado, M.S. Print Media from RIT, Technical Director of Tajamar Graphic Arts and Technical Institute (ITGT)

Statement of Problem and Research Objectives

Do people consume image-intensive content such as photographs differently depending on the medium of presentation? Does the medium influence the amount of time spent with content, the information gained and retained from it, and the value placed on it by the end user? Anecdotal evidence indicates that readers may interact with the same content presented in either printed form and on a computer display differently. But hard experimental data is not available.

The objectives of this research are:

1. To gain a quantitative understanding of the differences in time that readers spend with identical photo-intensive content when it is presented in printed form and when displayed on a computer monitor.
2. To gain a quantitative understanding of the differences in the accuracy of information about identical photo-intensive content retained from either medium.
3. To gain a quantitative understanding of the differences in the value placed on identical photo-intensive content when offered in either medium.

Method

The following methods will be used to achieve the stated research objectives.

1. Conduct comprehensive secondary research.
2. Design a publication containing a variety of photographic objects and captions that are determined to be of generic interest to a population of college students of mixed gender and academic focus. The content will include objective information about which unambiguous questions can be asked. The amount of content will be adjusted to enable subjects to read through it in ten minutes or less.
3. Prepare print and electronic presentations of the same content. The printed content will be in book form. The electronic content will be in PDF. The aspect ratio of the page will be compatible with screen display optimized for paging up and down through the content with the same intuitive ease as through the printed book.

4. Present individual subjects selected from the target population with either the print or electronic version of the content. Ask the subjects to take as much time as they need to absorb the content. Inform them that they will be quizzed on what they retain afterwards.
5. Record the amount of time taken by each subject. Record gender and other personal information about each subject that may be relevant (TBD). Each subject will interact with only one presentation medium, and will not be aware that any comparison is being made with the other.
6. When the subjects have indicated that they are finished, administer a quiz asking specific objective questions about the content.
7. When the subject has finished the quiz, offer to give him/her a copy of the publication in either (but not both) form (Print or CD), and ask some final questions designed to probe the value placed on the content in that form.
8. Repeat with a large enough sampling of subjects to enable statistically valid conclusions.



2009-2010 Research Proposal—Continuing Initiative

Open Publishing Guide - Development: Phase 2

Principal Investigators

Patricia Albanese, Gannett Distinguished Professor, School of Print Media, RIT

Matthew H. Bernius, Ph.D. Student, Cornell; Researcher, Open Publishing Lab, RIT

Statement of Problem and Research Objectives

Over the past year, the Open Publishing Lab has enlisted students as well as faculty to produce an informative publishing resource entitled “The Open Publishing Guide”. A beta version of the site is located at <http://opg.cias.rit.edu>. Over the past year we have developed the foundation of the site. In the coming year we propose to further develop, refine, and evaluate the usefulness of the content, features and tools of the site. Furthermore, we would like to propose a method for on-going maintenance of the site.

Research objectives include:

- Gather feedback and comments on the Open Publishing Guide Areas for feedback include:
 - » The usefulness of the Publishing Self Advisor software, developed for the site
 - » Overall usefulness of OPG site in actually completing publishing projects.
 - » User testing and research, including further user testing on usability, navigational and organization aspects of the OPG. Specific areas of review will include testing of the book production templates and tutorials.
- Research and support compatibility between Internet browsers.
- On going site maintenance and enhancement. To be effective it must keep current with the changes and trends within the self-publishing world. Enhancement of content. We will continue to add content to the site expanding the usefulness for users. Additional content includes tutorials, videos, publishing checklists, page templates, and other editorial content to assist our users on the self-publishing process.
- Further develop and research our marketing approach. This includes gathering data on the demographics of the users of the site.
- Further research the current barriers of the self-publishing process. By clearly identifying the restrictions to self-publishing, we can better predict and discover ways to make the process easier and to also widen the scope of self-publishing and it's users.
- Develop and implement on going maintenance plan during the first year of operation.

– Continued –

Method

Extensive research and review of existing tools and content will be conducted. Tools will be tested and documentation developed as needed. Site will be updated regularly and feedback will be solicited throughout the year.



2009-2010 Research Proposal—New Initiative

Typographic Expressiveness of Print Compared to Screen

Principal Investigators

Charles Bigelow, Melbert B. Cary Distinguished Professor, School of Print Media, RIT

Hye-Jin Nae, Assistant Professor, School of Design, RIT

Adam Smith, Assistant Professor, School of Design, RIT

Statement of Problem

The publishing industry has been undergoing a massive shift from print to on-line media. In the past month we have read that *Newsweek* will cut staff and downsize its print run; that *U.S. News & World Report* will reduce to a monthly magazine and shift most of its reporting to the Internet; that *The Christian Science Monitor* will cease printing altogether and shift to online editions; that Houghton Mifflin Harcourt has suspended acquisition of new book manuscripts; and that The Tribune company, publisher of the *Chicago Tribune* and the *Los Angeles Times*, has filed for bankruptcy.

The Internet is often cited as the major cause of the decline in print publishing. The Web is said to offer cheaper, faster, and more interactive alternatives to print publishing. As readers -- especially younger readers -- migrate from print to Web, advertisers follow.

Nevertheless, typography for print media retains important advantages over online media. One advantage is “expressiveness”. Typography for advertising, marketing, and corporate identity conveys numerous expressive qualities in addition to basic textual information. Other terms for expressiveness include “personality,” “impact,” “congeniality,” “atmosphere-value,” and “feeling-tone”.

A first-order approximation of typographic expressiveness is the basic number of fonts (typefaces) available for use. For print, there are perhaps 20,000 to 30,000 fonts available. For the Internet/ Web, there are only 20 to 30 “web-safe” fonts available for interactive use on all platforms. By this measure, print media enjoy a thousand-to-one advantage in expressiveness over HTML-based web sites.

The expressiveness of print may actually be higher than this scalar measure. Type experts and aficionados can distinguish, say, Verdana from Arial, or Times Roman from Georgia, but to a majority of computer users, these “web safe” fonts are similar in their “feel”. When font variety is diminished on the web, the typographic differentiation of products, brands, and corporate identities are also diminished. On-line news tends to look alike. Blogs tend to look alike. On-line stores tend to look alike. Because of the paucity of web fonts, the web tends to filter out typographic differentiation, despite vast sums spent on marketing and brand image differentiation in print and in traditional commerce.

A higher-order measure of typographic expressiveness is a multi-dimensional psychological scale in which subjects rate different typefaces on the basis of opposed connotational terms. (For example, does a given typeface look more masculine or feminine, more delicate or more rugged,

more expensive or cheaper?) If evaluated by connotational semantics, the typographical advantage of print may be greater than the simple ratio of font availability would indicate. Not only does print provide more variations of fonts, but the variations are greater than those of fonts for the Web.

Research Objective & Method

Our objective is to test the hypothesis that print provides greater typographic expressiveness than the web. In particular we will investigate higher-order measures of expressiveness or “personality” using a technique called the “semantic differential,” pioneered by Osgood et al. (1957) and implemented specifically for typefaces by Wendt (1968), Shaikh (2005) and others.

The investigation will proceed in three phases. The preliminary phase will examine standard typographic distinctions of size, weight (light/bold), and cursivity (roman/italic) in order to analyze, calibrate, and control these basic parameters.

The second phase will investigate the expressiveness of approximately 30 standard “web safe fonts” used in most HTML and CSS-based web sites. This phase will replicate some of the methods and font selections used by Shaikh (op. cit.), in order to compare our results with those of the prior study.

The third phase will investigate a sample of the thousands of available fonts. This sample will include the 100 “most popular” fonts of each of the major font vendors, including Adobe, Monotype, Linotype and others. To this commercial sample will be added a sample of non-commercial fonts, selected from various “free” font sites, that are popular with college-aged computer users (RIT students).

Corollary Investigations

A. Font Hyperlinking and Embedding

The expressive advantage of print typography may potentially be eroded by a group of emerging technologies for referencing fonts through embedding and hyperlinking in web documents. If web browsers and sites eventually implement font hyperlinking and embedding, the variety and expressiveness of fonts available to web media may be greatly expanded, thus reducing a current advantage of print. However, these technologies will generate thorny problems involving intellectual property, specifically the trademark and copyright of fonts.

As part of the above study, we plan to make a preliminary analysis of the current state of play in font hyperlinking and embedding on the web. Our goal is to assess the current practical implementations and their legal implications, in order to provide an overview of the potentially disruptive effects, as well as analysis of the forces opposing and supporting such trends.

B. Effects of increasing resolution and anti-aliasing technologies on the perception of text in print and on-screen

Print typography has long been the standard for legibility, enjoying unquestioned superiority over screen text for several decades. However, a doubling of screen resolutions over the past 25 years, coupled with anti-aliasing (smoothing) technologies that become more effective at higher screen resolutions, has notably improved the visual quality of text on-screen. This improvement has been associated with migration of readers from print to screen. We hypothesize that improvements in the perceptual quality of screen displays may not have had a positive attraction to readers, but rather, removed some of the perceptual barriers to shifting from print to screen reading.

Because our principal study will involve the viewing of fonts on screen and in print, in order to control for variables of viewing and media, we will make comparisons between viewing and reading in print and on screen, with attention to resolution and anti-aliasing.

These corollary investigations may be of benefit in understanding more of the factors that influence the shift from print to screen, with some factors opposing the shift while others supporting it.

References

- Larson, Kevin, et al. (2006) "Measuring the Aesthetics of Reading," in *People and Computers XX: Proceedings of HCI 2006, Vol. 1*, British Computer Society.
- Osgood, Charles, Suci, G. J. and Tannenbaum, P.H. (1957). *The Measurement of Meaning*. University of Illinois Press, Urbana.
- Shaikh, Audrey Dawn. (2007). Psychology of onscreen type: investigations regarding typeface personality, appropriateness, and impact on document perception. Doctoral Dissertation, Wichita State University, College of Liberal Arts and Sciences, Dept. of Psychology.
- Wendt, Dirk. (1968). "Semantic Differentials of Typefaces as a Method of Congeniality Research." *Journal of Typographic Research*, vol 2, no. 1, pp. 3-25.