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Adoption of Technologies for Contract Color Proofing in Commercial Printers

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

Introduction

The commercial printing industry has undergone extensive changes due to technological innovations and shifting economic conditions. These developments have likely influenced the technologies utilized to produce proofs for commercial lithographic printing work. In 2005, the Print Industries Market Information and Research Organization (PRIMIR) published an extensive report entitled *Dynamics and Trends in Color Proofing 2005–2010* based on research conducted by State Street Consultants. This comprehensive report analyzed all types of proofs across an extensive array of market segments. The present research examines a portion of these: specifically, contract color proofs utilized by commercial printing organizations are analyzed. For the purposes of the present study, important limitations are defined below:

Contract color proofs are defined as a proof that represents what the job will look like when printed on 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 this 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 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.

Need for the Study

Since the 2005 *PRIMIR* study, no quantitative analysis of technologies utilized to produce contract proofs for the commercial lithographic printing industry were found in an extensive review of the published literature. In the past seven years, major economic changes coupled with technological advancements have likely impacted production capabilities and customer expectations of all aspects of commercial printing. There is no reason to believe that the technologies utilized to produce contract proofs would be an exception to the shifts that affected the entire industry. Furthermore, as the 2005 *PRIMIR* report projected to 2010, it is suggested here that an update in this area is a timely addition to the literature.

Purpose

The present study uses a cross-sectional questionnaire instrument to collect quantitative data designed to examine the technologies utilized to produce contract proofs. Trends in this field can be a concern for several constituencies, including commercial printers and print buyers, industry manufacturers, standards/specifications committees and educators.

Understanding the stage of proofing technology adoption relevant to the product lifecycle is potentially important information for relevant stakeholders. To help to ascertain the stage of contract proofing adoption among commercial printers, comparisons of the currently reported adoption of contract proofing technologies with the 2005 *PRIMIR* study are made to examine possible trends and adoption in this particular domain.

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 are increasingly moving away from hardcopy halftone-based proofing to digital technologies that are not halftone-based: these technologies include inkjet, toner-based, and virtual soft 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 technology adoption, Everett Rogers' *Diffusion of Innovations* represents literature pertinent to the subject. Rogers (2003) defines diffusion as "…the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). First published over 50 years ago, Rogers' *Diffusion of Innovations* (DOI) has provided the basis for studying technology adoption, and is widely regarded as the seminal work in

Adopter categorization on the basis of innovativeness. Adapted from Roger's Diffusion of Innovations, Fifth Edition (p. 281).

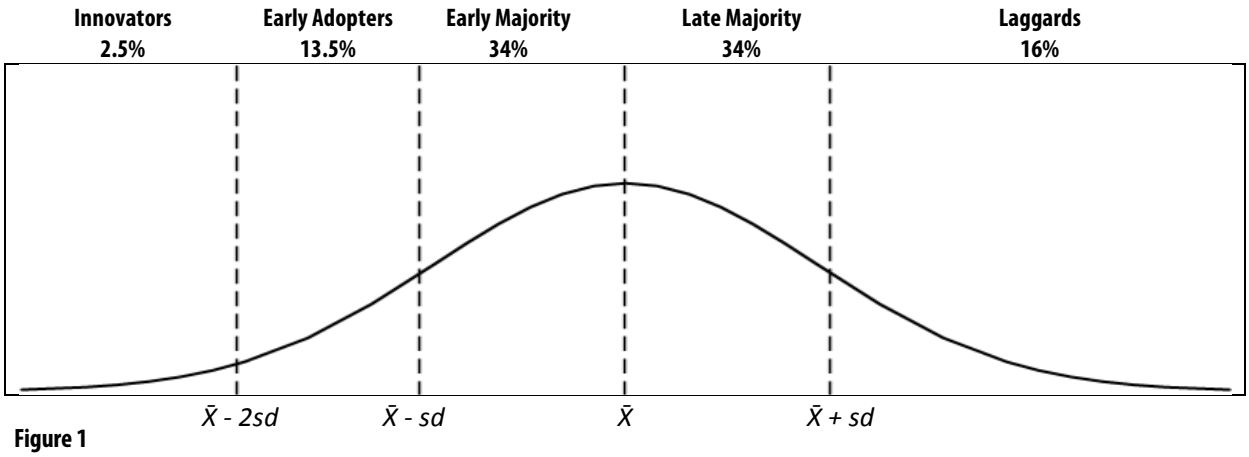

Figure 1

this field. Perhaps the most famous element of Rogers' theories is his contention adopters of any new innovation or idea could be categorized as innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%), based on a bell curve, as illustrated in Figure 1 (Rogers, 2003).

Several researchers have studied innovation diffusion and technology adoption in the graphic communications industry. Relevant studies range from research involving the adoption of computer electronic prepress systems (Nwako, 1990) to an examination of the barriers to successful implementation of a print management information system (D'Amico, 2006) to Burgess, Burkinshaw, and Vijayan's 2004 study which examined the diffusion of digital inkjet printing in the textile industry.

Research Design and Methodology

Using a self-reported mailed questionnaire instrument, pre-media managers working at various graphic communications organizations were selected to receive the survey in the spring of 2013. One hundred different organizations were selected using the 2012 *Printing Impressions Top 400* as a basis sampling frame. In a manner consistent with Dillman's *Mail and Telephone Surveys, The Total Design Method* (1978), managers were contacted first with an introductory letter, followed in several days by the survey instrument packet. The survey instrument packet included the survey instrument booklet, a letter of instruction, and postage-paid return envelope. Two weeks after the initial packet mailing, a reminder postcard was sent to non-respondents, and approximately ten days after the reminder postcard a second survey packet was mailed 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, the survey instrument began with a qualifying question which defined general commercial color lithographic printing, and 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 also responded to the subsequent questions. Of the 49 usable responses, 24 indicated that their company location employed 100 or more, ten reported 50–99 employees, and 7 reported 20–49 employees.

Data Analysis and Results

The study solicited information regarding the mix of contract proofing technologies that are in use by general commercial lithographic printing companies. As indicated in Figure 2, the reported utilization of virtual proofing increased from 7 to 16% in organizations with 19-49 employees, while it decreased from 14 to 10% in organizations with 50–99 employees, and remained constant at 9% for companies 100 or more employees. Further, more companies are reporting jobs where no contract proof at all is required. These include 7% of all jobs for companies with 50 or more employees and 4% of all jobs for companies with 19–49 employees.

Percentage of contract color proofing technologies utilized by commercial printing companies by company size: 2005 compared to 2013

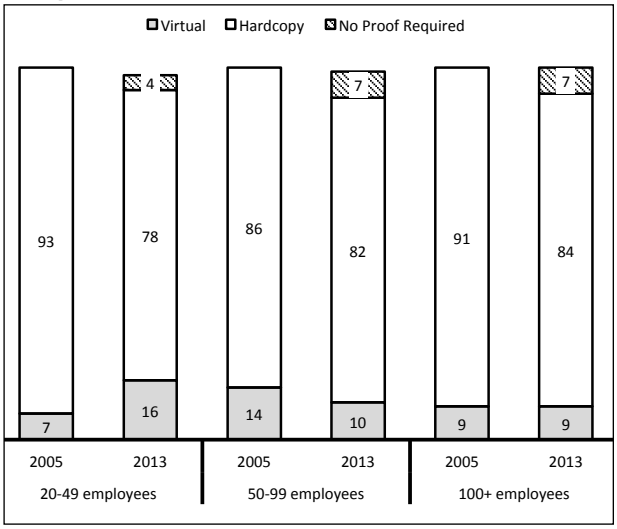

Figure 2

A summary of the types and percentages of respective contract proofs utilized by the respondents is illustrated in Table 1.

A closer look at the virtual proofing technology utilized across all commercial printers reveals that of the 49 commercial printing respondents, 31 reported that virtual, monitor-based soft-proofing technology is sometimes utilized for contract proofs. Of these 31 monitor-based proofing adopters, 11 (35%) reported using soft proofs which were not color managed at least one-half of the time that virtual proofs were used, whereas 13 of the 31 (42%) utilized color managed monitor proofs for at least one half of their virtual proofs.

Turning to the hardcopy proofing technologies utilized, continuous-tone hardcopy proofs are clearly dominant, accounting for over 88% of the contract proofs. These technologies include inkjet, toner-based, and photographic technologies. Halftone-based technologies, which include ink-on-paper press proofs and digital halftone technologies account for nearly 11% of the contract proofs reportedly produced in this market.

As continuous-tone proofs represent the dominant form of hardcopy proofs, a further analysis of the types of technologies utilized was here performed. The present study analyzed toner-based technologies two ways: one defined as digital presses which utilize liquid-or dry toner-based technologies (e.g.: H.P. Indigo, Xerox iGen, Kodak NEXPRESS) and the other defined toner-based devices as "networked color copiers". Together, these toner-based technologies reportedly represented close to 23% of the hardcopy contract proofs utilized in this market, with the networked color copiers representing close to 7% and digital presses representing almost 16%.

Recognizing that in addition to halftone- and toner-based technologies, other marginally utilized types of proofs, including photographic or dye thermal sublimation which are not halftone-based, were reportedly used for less than one percent of the hardcopy proofs made by commercial printers. It is therefore clear that inkjet technologies continue to dominate the hardcopy proofing market, representing nearly two-thirds of the contract color hardcopy proofs produced.

Consistent with the 2005 PRIMIR research, the adoption halftone-based proofing technologies represent a minority in the commercial printing market, accounting for nearly 11% of the reported hardcopy contract proofs utilized. Digital halftone proofs (e.g.: Fujifilm Finalproof and Kodak Approval) did represent nearly 8% of the hardcopy proofs being made by larger commercial lithographic printers surveyed, while just over 3% were represented by ink-on-paper press proofs.

Table 1: Contract color proofing adoption among commercial lithographic printers 2013

Virtual contract color proofing adoption among commercial lithographic printers	
Some virtual contract proofs	63%
Percentage of virtual proofs color managed ≥ 50%	42%
Percentage of virtual proofs non-color managed ≥ 50%	35%
Hardcopy contract color proofing adoption among commercial lithographic printers	
Continuous-tone hard copy proofing	88%
Inkjet-based continuous-tone hard copy proofs	64%
Toner-based continuous-tone hard copy proofs	23%
Toner-based continuous-tone proofs: networked color copier	7%
Toner-based proofs: digital press	16%
Other continuous-tone hard copy proofs	< 1%
Halftone-based hard copy proofs	11%
Ink-on-paper halftone-based hard copy proofs	3%
Digital halftone-based hard copy proofs	8%

n=49

Findings

The results of this study indicate that the proofing market is moving towards less sophisticated technologies. Of course, the least sophisticated contract proof is for a job that requires no proof at all. Monitor-based virtual "soft" proofs also have impacted the marketplace: a sizeable percentage of these are reported as not being color managed at all. This likely means that all sorts of devices, from computers to mobile devices could be future platforms for contract proofs for a segment of the commercial printing market. Solutions utilizing virtual proofing on newer-type devices could likely be considered in the early stages of Rogers' DOI, while monitor-based proofing in general appears to have 'stalled' in the commercial printing industry when the present results are compared to the 2005 *PRIMIR* research. Further research will be required to more confidently assign a stage of adoption for these virtual proofing technologies.

The present study segments toner-based technologies into "networked color copiers" and "digital presses." Networked color copiers represent another example of what could be considered a less sophisticated technology. Alternatively, digital presses represent another source of contract color proofs for lithographic jobs. While it is unlikely that an organization would incur the cost of a digital press solely for the purpose of making contract proofs, many offset printers have adopted digital presses to enhance their product offerings, especially in the area of short-run, fast-turnaround work. This means that these organizations could have color digital presses on their floor already. It comes as little surprise that tightly controlled digital presses can produce proofs as accurately as their inkjet cousins if production constraints and job format size permits their use. As the consumable imaging costs of digital presses is likely less than that of inkjet, these marking engines can be poised to capture more of the contract proofing market moving ahead. When viewed in the framework of Rogers' DOI, it is difficult to confidently assign an adoption stage for these particular technologies as proofing devices: using these toner-based marking engines as proofers is likely not the sole or even primary purpose in most organizations.

Consistent with the 2005 *PRIMIR* report, now mature inkjet technologies continue to dominate the contract proofing market. This study indicates that other continuous-tone technologies such as photographic and dye-thermal sublimation represents marginal technologies as proofs for commercial printing jobs. Established technologies like these could be considered in the "late majority" or "laggard" stages of Rogers DOI.

Halftone-based hard copy proofs are the most complex and expensive of the examined proofing technologies continue to represent a small percentage of proofs produced. Their continued use is sufficient for some printing organizations to maintain production for what is likely the most demanding and price indiscriminant buyers. New adopters of these technologies would likely be considered "technological laggards" when viewed through Rogers' DOI theory.

Conclusions

The trend toward jobs requiring no proofs and virtual proofs that are not color managed represents an interesting condition for the commercial printing industry. Perhaps this indicates a lessened emphasis on precise color reproduction, together with an increased level of confidence in the printer's ability to produce accurate, consistent color reproduction without the need for a physical or virtual contract proof that is color managed. Other job factors, including cost, turnaround time, and shortened run lengths may be of more value to this segment of the market. This finding points to the realization that a segment of the commercial printing market may be ready to embrace technologies such as workflow tools that support customer-relevant factors in real time utilizing the Internet and cross-platform display technologies. Innovators and early adopters here may have an edge in providing enhanced customer value.

Future research

As the present study is quantitative and cross-sectional in nature, future researchers could adopt a more qualitative approach to print providers and buyers to obtain a richer understanding of the salient factors driving the technologies utilized for contract proofing. Further, as this research is limited to commercial lithographic printing, future researchers may add additional market segments, including packaging, publication, advertising agencies and in-plant printing operations. Finally, the present research is limited to technologies serving as contract proofs only: technologies utilized to produce concept, content, and imposition proofs could be examined by researchers to develop a more comprehensive view of the proofing market as a whole.

Further, to draw more confident conclusions on any technological innovation through Rogers' DOI it is sug-

gested that at least three data points are necessary. If adoption rates increase, the technology can be assigned to the "innovator," "early adopter," "early majority" side of the adoption curve. However, if it appears that the technology has peaked, then it is more reasonable to view the technology on the "late majority" and "laggard" side of Rogers' DOI curve. Therefore, future researchers may revisit these technologies in the coming years and update comparisons with the PRIMIR study and the present research.

Acknowledgement
I would like to thank RIT Master's Candidate Xi Yang for her assistance with this project.

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Digital Large Format Part III: Cameras and Lenses

by Chris Lantz, Ph.D. • Western Illinois University

Introduction

This is the last of a series of three articles on large format photography. This third part covers selecting lenses and cameras for large format digital capture (see the Spring 2012 and Fall 2012 issues of the Visual Communications Journal for parts one and two of the series). Large format scan-backs can be used with all large format film lenses. Most of the image plane on a large format camera is used with little crop factor. This is the main advantage of scan-backs such as the Betterlight and Phase One. However, lenses and cameras used for medium format and digital-single-lens-reflex DSLR shift-backs are more problematic. These use a much smaller area and greater crop factor of the projected image from the standard 4×5 film lens.

Lenses designed for optimum sharpness with a smaller projected image plane are a good match for medium format and DSLR shift-backs. Medium format backs require adaptors for either universal or proprietary camera brand specific mounting plates. DSLR backs require large format cameras where the front and rear of the camera can be moved close together and used in conjunction with recessed lens boards. Normal angle-of-view for medium format and DSLR backs require short focal length lenses such as 80mm. This makes close distances from lens to digital back necessary for far focus distances. These concepts will be explained and discussed in more detail in the following sections.

Lenses and Shutters for Medium Format Backs

Wide-angle film lenses are one low cost solution as a short focal length lenses usable for medium format backs. The problem with these lenses is that they were designed to cover 4×5-inch and larger film sizes, with room for camera movements. Using wide-angle film lenses for digital medium format backs ends up using only a small central area of their projected image size, being converted to near normal focal length due to crop factor. The sharpness and contrast of these lenses are not as good as lenses optimized for smaller image sizes. Lenses with smaller projected image sizes include enlarging lenses, copy lenses and purpose-specific digital lenses. Wide-angle film lenses can be acceptable for the low megapixel count sensors found in older backs or for close up and macro photography.

Lenses optimized for medium format digital are available from *Schneider, Rodenstock* and *Sinar*. These lenses have less color fringing near the edges of the frame and better sharpness for digital. They also often have anti-reflective coatings and color aberration correction specific to digital backs. The first generation of lenses used for digital back systems were high-grade enlarging lenses which were mostly *Schneider Componon-S and HR*. These lenses were engineered for negative enlarging purposes, such as printing medium-format film in a darkroom. Enlarging lenses of this type produce a projected image size that is about the same as the purpose-specific digital lenses. Some enlarging lenses have single anti-reflective coatings and are more susceptible to flare. A good lens shade with masking blades can control flare well. An old method used to control flare in the studio with an uncoated or single coated lenses is using black card stock to mask bright areas in a seamless background that is not in the frame of view.

A lens barrel is the center of the enlarging lens that contains the f-stop aperture control (figure 1). Lens cells are threaded on the top and bottom of this barrel to make an enlarging lens. Many of these same cells can be screwed onto the top and bottom of a shutter. Many enlarging lenses or copy lenses such as *Componon* lens cells can be unscrewed from the barrel and threaded onto a standard *Copal*-0 shutter. A *Copal*-0 shutter contains a leaf shutter with X-sync flash sync terminal and aperture f-stop control. Do not use first generation *Copal*-0 (made in Japan) or *Compur*-0 (made in Germany) shutters that have both an X-sync and M-sync control. Most of these old M-sync flash bulb compatible shutters do not work with medium-format backs such as *Phase One* even on the X-sync setting (figure 2). Older lenses can sometimes be moved to new type shutters because they use the same *Copal*-0 or *Copal*-1 threads. Moving lens cells onto a different shutter is less problematic with digital because the f-stop scale does not have to be moved over. Moving the scale over is not always possible because different sized f-stop scales exist on different versions of the same shutters. Approximate f-stops are fine because test exposures or scans are used to determine exposure. A new aperture scale can be created by a photo specialized machinist such

as *S.K. Grimes,* but it is not necessary. Longer focal length *Schneider Componon's* such as 240mm or 180mm make good telephoto focal length lenses with generous camera movements possible. These lenses were originally designed to print negatives or make color separations with an enlarger from 5×7-inch and 8×10-inch transparencies.

The best shutter to use on a large format camera for medium-format digital backs is a *Copal*-0 or *Copal*-1 press shutter (figure 3). Modern *Compur press* or *Prontor press* shutters with X-sync only are less common. A press shutter is a self-cocking shutter that can be fired rapidly. These shutters can be used to pre-trigger the digital back. The back would normally need to be activated before use with a capture button within capture software. One press of the shutter will ready the digital back and another will take the picture. This can be done with a standard shutter but it has to be cocked between exposures. There is only a five second period to take the picture (indicated with green blinking lights on the back). For still life product photography, where the camera is often directly on top of the subject and it can be hard to get at the standard shutter to cock it multiple times per shot. This is especially true if hundreds of exposures are made in one shooting session. The alternative to this is to use a special (and expensive, with prices in the $400.00 range as of this writing) double cable release pre-trigger made by *Capture Solutions*. The press shutters, on the other hand, are inexpensive because they can be decommissioned from old instrument cameras such as the *Polaroid DS-34* oscilloscope or gell cameras for around $35.00. As a note of caution, if the shutter is older and has never been cleaned it may not sync with the medium format digital backs on slow speeds, such as one-second exposures. All five used in this case study worked with flash.

Copy lenses originally designed for the *Polaroid MP-4* copy camera work well with digital backs on large format cameras. These lenses thread directly onto the bigger *Copal*-1 shutter size. The 17mm, 50mm, 75mm, 105mm and 135mm *Tominon* lenses are all optimized for smaller image sizes (originally for *Polaroid* prints). They have

These are two sized lens barrels (1 and 0) that contains a lens aperture control. Lens cells are screwed on the top and bottom of the barrel (right).

Figure 1

Old M-sync (flash bulb sync setting) shutters did not work in this case study even when set to X-sync (electronic flash sync setting) with a medium format back.

Figure 2

A Copal-0 press shutter (right) and a standard Copal-0 shutter with the large cocking lever on the right.

Figure 3

simple single-coated elements well suited to low-cost and lower resolution digital backs (figure 4). Lenses designed for copy and macro work do not need big projected image sizes. Higher magnifications in macro work result in a further spacing between the lens and camera back, which increases the size of the projected image. *Tominon* lenses cover a wide range of angle-of-view for small product photography or macro work, but can also be used at a further distance with good results. The lenses are in barrel with their own f-stop control. They are threaded onto their original *Copal*-1 press shutter that has no f-stop mechanism. These lenses work optimally 2–3 stops down from wide-open f-stop, especially at extreme macro distances (figure 5). The more expensive lenses are sharper when stopped down further, but many applications don't need high depth of field. This is especially true if focus-bracketing techniques are used in *Photoshop* (Lantz, 2009).

When mounted on a standard flat plane large format lens board, the 50mm and 75mm *Tominon's* will only focus on close up or macro distances. An example is the watch face

Tominon copy lenses and shutter

Figure 4

An inexpensive Tominon 105mm copy lens from an oscilloscope camera was used for these photos with enlarged image detail. The enlarged detail on the bottom left was shot at f-22 and on the right f-45. Image quality suffers if lenses are stopped down all the way especially for macro or close up work.

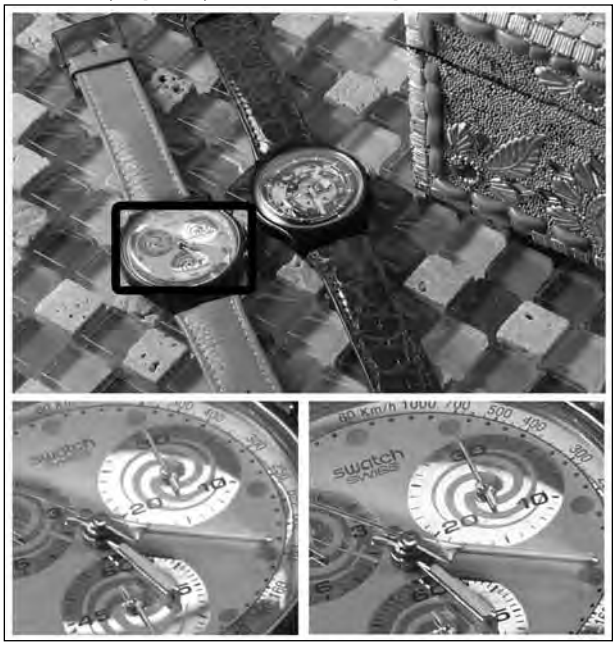

Figure 5

Selective focus with a very shallow depth of field was used on the left at wide open and with optimum aperture (f16) in the middle with a Tominon 75mm copy lens. The photo on the right of a watch mainspring was taken with a 17mm Tominon lens designed for extreme 4×5-inch macro work. The call out area in the middle photo shows the area of magnification in the right photo. Tominon lenses are common decommissioned copy lenses.

Figure 6

Double-recessed lens board

Figure 7

photography in figure 6. An inner-recessed lens board originally designed for large format, wide-angle film photography allows further focus distances. The 50mm and 75mm lenses will usually not achieve infinity (or furthest focus distance) even with a recessed lens board. If such a recessed board is used within another recessed lens board adaptor, an additional 2–3 inch recess is possible. Depending on the camera design, this will perhaps allow infinity (or far focus) on 75mm-80mm lenses (figure 7). Certain cameras such as *Cambo* and *Toyo* monorails have recessed boards with larger sized recessed areas. These boards can more easily accommodate a shutter release cable if an angle adaptor is used. Finding a compatible angle adaptor can be challenging. Some press shutters require a special cable such as the *Gepe* brand with an extra long length rod extending from it. Drilling a hole in the side of the camera for cable release access is not necessary with the correct recessed lens board and angle adaptor (figure 8).

Angle adaptors allow shutter release cables to be threaded into recessed lens boards

Figure 8

Lenses for Scan-Backs

Lenses without shutters, such as enlarging lenses, are usable because the scanning wand in a scan-back is used to make exposures. The scan-back requires the least investment in new lenses. This is because the scan-back uses a larger proportion of the projected image size of the standard 4 x 5-inch large format lens (as compared to DSLR and medium format backs). There is some small crop factor that is usually indicated by a thin ½-inch mask used over the 4 x 5-inch ground glass to show cropping for scan backs. The large crop factors of DSLR's are apparent when compared to the small crop factor indicated by the scan-back mask. Digital lenses provide a slight improvement over film lenses for scan-backs. Another advantage of the scan-backs is that camera movement increments are similar to those of 4×5-inch film. The smaller more precise camera movements, especially on a DSLR back system, can take longer to master for a large format film photographer.

Some graphic arts programs may have as surplus the process lens made for process cameras. These lenses have very large projected image sizes. Longer process lenses are not good lenses for medium and DSLR backs, though they can work well for special purposes with a scan-back. A process lens is a long focal length lens but it is not a telephoto design that requires less bellows length. A very long bellows length is required for a typical process lens such as the 420mm *Apo-Nikkor* (a lens from a decommissioned horizontal process camera). Long lenses can create a unique effect for product photography because they compress perspective and flatten distance between props (figure 9). A more heavy-duty tripod with sand bags would be necessary for higher angles with this heavy dual bellows extension configuration.

To use a long focal length process lens (420mm Apo-Nikkor) on a large format camera a long rail extension and two bellows were needed. The effect of this lens is very narrow depth of field at wide open (f-9) and a compressed perspective that brings distances close together.

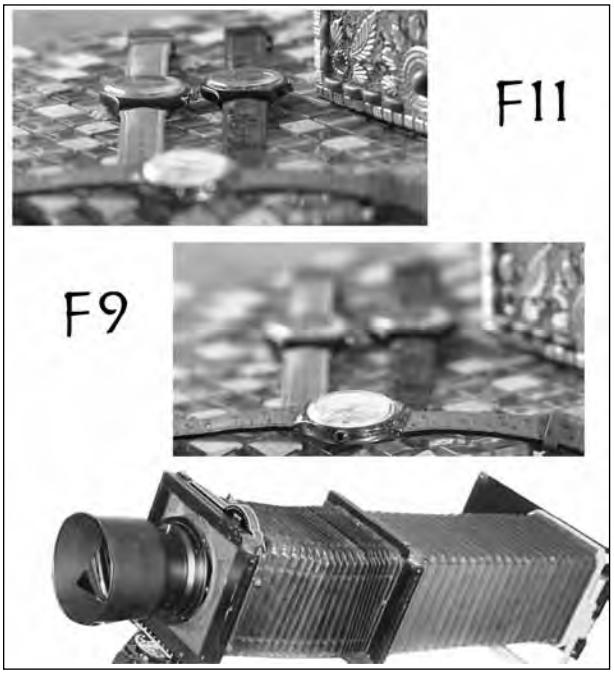

Figure 9

Cameras for Large Format Digital

The following sections detail different cameras selected for medium format, scan-back and DSLR shift-back photography. Some large format system cameras such as *Cambo*, *Toyo* and *Sinar* will work for all three applications. They have adaptable system components, such as variable length rails and bag bellows. Most of the cameras covered in the following sections are available surplus equipment.

Cambo portrait camera repurposed as a macro copy stand camera.

Figure 10

Sinar large format camera rails can be used to create a portable copy stand that is useful for macro photography (right). Two focused bright LED lights on goosenecks are versatile in the lighting effects that can be created (left). A Sinar F was used in this photo but was found to be not rigid enough compared to a solid body camera without a bellows.

Figure 11

Repurposed Cambo Portrait Camera

The *Cambo* portrait camera is a die-cast solid aluminum camera body designed for fixed focus distance *Polaroid* portrait photography with a 250mm lens (figure 10). Such a camera can be home made out of wood or metal and has a 12-inch extension. The lens cells can be removed from its *Copal*-1 press shutter and then a low cost *Tominon* copy lens or enlarging lens can be directly attached on the front of the camera. The camera has a universal back to which a scan-back can be attached. The DSLR adaptor would not work well on this camera unless it is for an extreme close-up. It does not come with a ground glass, but the ground glass found on a generic medium format back adaptor could be used. A standard ground glass assembly can be used from a *Cambo* monorail for use with a scan-back. Since the camera has a fixed focus distance many different focal length *Tominon* lenses (35mm, 50mm, 75mm, 105mm and 135mm) are used to achieve different macro magnifications. The camera is rigid and not prone to motion blur due to vibration (such as from a wood floor). The camera is more rigid because it has no bellows and it is low in profile without the high profile rail clamp found on a monorail. A portable copy stand was created with *Sinar* rails designed for this application (figure 11). Since no focus is provided on the camera, a movable platform called a lab jack is used for focusing. The whole system can be broken down to fit in a small case. LED microscope lights on goosenecks make good light sources for the shorter focal length lenses. These simple, very bright LED lights can produce a variety of effects with small props.

Linhof Monorail

The *Linhof Bi-Kardan* is a big heavy monorail from the 1970's that makes an excellent studio camera for scan-backs (figure 12). It has good short focal length focus

Linhof Bi-Kardan.

Figure 12

capability. Accessories can be hard to find because most are no longer made. It is used with two recessed lens boards together for far tabletop work with a 80mm *Componon* enlarging lens. The *Phase One Studiokit* is a large, heavy scan-back that can make a camera unstable even on a heavy tripod. This heavy camera balances well with the *Phase One* back. This is not a camera to use on a copy stand because it is high in profile and too heavy. There are several other current heavy monorails made to compete with the *Bi-Kardan*. *Toyo GII*, *Sinar P2* and *Cambo 4×5-inch Ultima* are other examples of large heavy monorail cameras. Do not use these cameras in the field unless it is kept in a car for transport because they weigh is as much as some 8×10-inch cameras. Pick a lighter camera such as the *Sinar F, press*, or *woodfield* camera for field use.

Sinar P with Sliding Back

Students that try to lock scan-backs on a universal back or insert them into a spring back can easily drop them. A sliding adaptor is a sliding panel that contains a ground glass on one side and the digital back attached with a universal back on the other side (figure 13). These were originally made for rapidly moving a roll film back into the focal plane and then focusing the next shot on the ground glass by sliding back and forth. There are some models made for a smaller 2×3-inch *Graflock* size, so to assure it fits confirm that it uses the correct standard 4×5-inch *Graflock* universal back. *Sinar* had a specific model that works well on a *Sinar P*. The P is necessary because the sliding back and scan-back are heavy and need a heavy-duty camera and rail clamp. Two standard rail clamps can be used for longer focal lengths or a more stable Clamp-2 is necessary (figure 14). One inexpensive alternative is to find an old *Sinar Norma* clamp which has an over-the-top-of-the-camera rail attachment. The *Sinar P* is a camera from the 1970's that uses nylon gearing. The *Sinar P2* is a newer black paint version that is more expensive.

Sinar-P with sliding back.

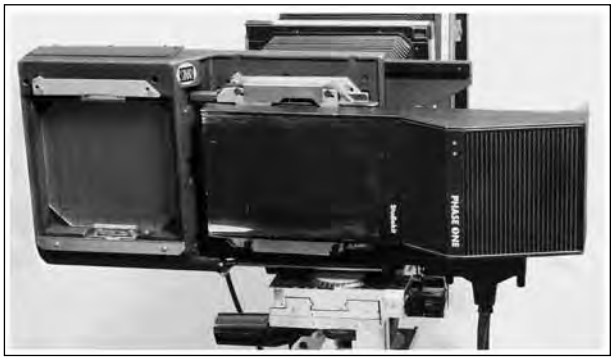

Figure 13

Medium Format Monorail: Cambo Ultima-23

The *Cambo Ultima-23* is a small and heavy 2×3-inch medium format monorail camera (figure 15). The *Ultima-23* can fit a DSLR camera with the correct adaptor kit. It can easily be converted back to the 4×5-inch *Ultima* by replacing the back and front standard frames. It is used with a special small bag bellows. This configuration was chosen because a DSLR adaptor is the least expensive option and it is resistant to obsolescence because the *Ultima* camera itself has no electronics. A 80mm *Schneider Digitar* was chosen for future upgrade to medium-format back because it has a built in *Copal* shutter. The shutter is not needed for the DSLR. It has enough image size to cover the DSLR and medium format backs

Rail clamps for monorail cameras. The more stable Sinar camera rail Clamp-2 (rear) with an over the top clamp and the older Clamp-1 that has a tendency to twist with heavy cameras and long bellows extensions (front). Both rail clamps are high in profile (decreasing stability) but could be used with low profile tripod heads designed for large format.

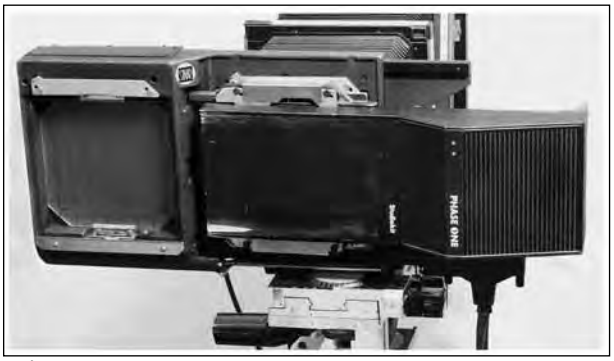

Figure 14

Cambo Ultima-23 camera with a Fuji S3 DSLR attached with a proprietary adaptor.

Figure 15

with camera movements possible using the bag bellows. This camera was expensive and only one could be purchased. It served as a point of reference in constructing homemade versions out of off-the-self parts. It has dual-duty as a 4×5-inch scan-back camera.

Homemade Sinar Modifications

One homemade camera that was inspired by the *Ultima* is a *Sinar P* with a wide-angle bag bellows and a homemade recessed lens board (figure 16). The recessed lens board was made from the plastic accordion section of a sink plunger fitted to a standard lens board. The plunger does not hold the lens completely level, but this can be compensated for with camera movements. It is hard to break the ground glass when focusing the camera because of its accordion flexibility (breaking the ground glass with the *Ultima* can be a common and expensive occurrence with short focal length lenses such as 50–80mm). A special aperture control ring was constructed to change the f-stops in the deeply recessed lens board. The *Sinar P* was chosen because the camera was used in the studio with a special low-profile bag bellows. The P also has a short distance capability between the back and front of the camera for short lenses.

Technical Camera and DSLR

The *Linhof Technika* (figure 17) is a compact, rigid and heavy metal folding camera. It can make a good platform for a DSLR shift-adaptor. The older models such as the *Technika IV* from the 1960s can be affordable especially if it needs a new bellows. Current models of this camera, such as the *Master Technika*, are very expensive. Monorails and wood cameras have too much vibration for field use on a windy day, especially with longer focal length lenses and a DSLR adaptor. The main limitation on the *Linhof* is that no bag bellows is available so no camera movements are possible with short focal length lenses. A recessed lens board is needed for 125–135mm lenses due to the spacer tube on the shift-back adaptor. The lens board can be set up with a shutter for either film, medium format digital, or DSLR photography on the same camera (figure 18). Generic recessed off-center *Copal*-0 lens boards are available for sale on Internet sites, with the original *Linhof* recessed boards being much more expensive. If the lens is to have multiple uses as a film or medium format digital-back lens, some material may

Homemade recessed lens boards made from 63mm hole Copal-3 flat lens boards, a sink plunger and black tape for light proofing.

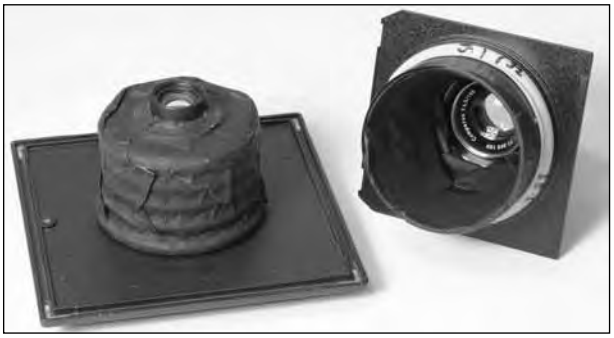

Figure 16

Linhof Technika III camera from 1958.

Figure 17

Linhof Technika generic recessed lens board that was modified for a standard Copal- 0 shutter. This is a good combination for DSLR shift-back photography on a Linhof Technika IV and 125mm lens cells that are screwed on the front and rear of this assembly. The aperture control is used for the DSLR and the shutter is used for film and medium format digital.

Figure 18

need to be ground away for clearance of the shutter cocking lever and f-stop control. An added advantage to the recessed lens board is the camera can be closed with the lens still attached making quick set up possible. These recessed boards are too small for a press shutter because a longer *Gepe* brand cable will not have room to thread onto the shutter (even with an angle adaptor). Movements are possible with longer lenses such as 150mm–300mm and this is where the rigidity of the camera is most important.

The Press Camera and DSLR

The *Crown Graphic* (figure 19) is a camera with limited movements used by photojournalists until the early 1970's. It has a leather wrapped wood construction that is not as rigid as the *Technika*. It is lighter and more rigid than a monorail for short focal length lenses especially for a copy stand. This is because it has a lower profile without the rail clamp on a monorail. It does not have a recessed lens board, so it is mostly used for macro close-up work on a copy stand with a DSLR shift-back. The lens cannot be moved close enough to the back of the camera for far distant focus with a 125–135mm lens on a DSLR adaptor. For this reason it is not used for fieldwork like the *Technika*. While the original bellows on these old cameras are almost always in good shape, the camera can be purchased at an even lower cost if the rangefinder is broken (which is not needed for DSLR work).

Crown Graphic press camera with a DSLR attached.

Figure 19

Conclusion

The large format camera system is the most adaptable type of system, with many configuration options useful for a variety of digital capture needs. *Nikon*, *Canon*, *Pentax* and *Sony/Minolta* all manufacture mounts available in sliding and fixed DSLR adaptors. For medium format backs, *Mamiya*, *Hasselblad V*, *Hasselblad H*, *Fuji GX* and *Contax* digital back mounts are available in low cost generic form. Large format cameras can also accommodate a variety of low cost lenses and shutters originally made for other purposes. Photographers might see such a vast selection of camera and lens components as too complex, but there are many commercial and industrial photographers who have made large format their tool-set for almost any assignment. Photographers are using cameras made in the 1950s with DSLR, Medium-format and scan-backs. Many are also using currently available large format camera models. It is truly a camera system that many technical photographers will never out grow.

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IGAEA Name Change: Process and Analysis

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An organization may change its name for a variety of reasons: to improve public understanding about the organization, to maintain enthusiasm among the membership, as a marketing tool to gain exposure, or to keep up with changing times. In September 2011, the International Graphic Arts Education Association (IGAEA) formed a committee to explore a name change for the organization. Initial reasons for exploring a change of name was to assure that the name reflected the current discipline and also a response to the perception that the current name was awkward to say and difficult to remember. From the beginning, it was critical to the committee that the name change process would be carried out in grass roots, democratic fashion, rather than a top-down fashion. This required that a procedure be put in place that involved the membership at every stage. After several meetings, the committee determined the initiative would be carried out in a 4-phase process.

Phase 1: Membership Support of Name Change Initiative (completed in July, 2012)

To determine whether exploring a name change had the backing of the membership, information was shared and all members were asked to provide input. Two *Communicators* (the IGAEA quarterly newsletter) were published, one in 2011 and one in 2012, urging members to provide input on a *Name Change Forum* established on the IGAEA website. Also, it was urged that members update email and contact information on the IGAEA website to assure that an email correspondence was to be received. Additionally, a focus group of more than 40 members convened at the 2012 IGAEA conference at Clemson University to discuss the matter. The straw poll taken at the conclusion of the focus group meeting had only one member in decent of continuing the process.

Phase 2: Choosing a New Name Democratically (completed in March of 2013)

To assure a democratic process to the new name selection, a modified Delphi technique was used. This is a process used to gain consensus from a large group of experts (in this case, our members). This process involved several rounds of web-based surveys sent to the membership by email.

The four rounds of surveys:

Round one—The first survey solicited name ideas. Each name idea was also able to be accompanied by a rationale.

Round two—The second survey included an unordered list of the names/rationales compiled from the first survey. The membership rated each name idea on a scale of 1 (poor) to 5 (excellent), with space to add comments. Based on the compiled ratings, the list of the top 10 names was ordered from highest rated to lowest rated.

Round three—A third survey was provided with the ordered list of 10 names and associated comments. The membership was asked again to rate each name after reviewing comments. Members added more comments as well.

Round four—A fourth survey included the only the top three rated names with rationales and comments. These three names were ranked by the membership and then tabulated to arrive at a single name.

Phase 3: Name Change Vote (completed in May of 2013)

A final vote to either (1) change the name or (2) keep the IGAEA name went out to membership on a paper ballot (according to bylaws). To reduce postage and increase participation, it was decided that this ballot be included with the annual ballot voting in officer elections.

Phase 4: Implementation (carried out from 2013 to 2014).

At the time of this writing, phase four has yet to be completed. The committee researched the logistics of changing an organizational name, with particular emphasis on the legalities. Changing the name of an organization requires a legal process that can be costly. It was decided that changing the name with a Doing Business As (DBA) legal process would be affordable and achievable. Essentially, a DBA would allow IGAEA to keep its current incorporated name (IGAEA) for legal purposes, but use its DBA name for all correspondence, marketing,

and membership identity. In addition to a DBA, it was determined that many elements would be needed should IGAEA have a new name, including a new logo, new forms, and a new/updated website.

Phase Two Methodology

Research has shown that a Delphi Technique is a good way to bring a large number of experts to concensus. It is a methodology that typically consists of multiple rounds of questionnaires and commentary. "The technique benefits from being a democratic and structured approach that harnesses the collective wisdom of participants." (Powell, 2003, p. 381). It is an interactive process used to gain consensus by a panel of experts as they obtain, evaluate, and reevaluate generated data. The principle behind the Delphi Technique is that group decisions tend to be more accurate than individual decisions. Each round includes panel responses from the previous round, with the first round being more open-ended and later rounds providing the opportunity to rate these responses all the while encouraging the group to come together and reach concensus. The entire IGAEA membership was selected for use as the panel of experts in this initiative.

Internet technologies were used to deliver four interactive rounds of a web-based survey. *SelectSurvey* was used to create, deploy, and analyze the results of the IGAEA Name Change Initiative. *SelectSurvey* is an Internet application that can be used to implement web-based surveys. The survey participants were chosen from the IGAEA membership roster. A list of current members along and their email addresses was compiled and inserted in the *SelectSurvey* database. An anonymous survey format was employed to remove any influence in the commenting and rating of name ideas. In theory anonymous interaction encourages respondents to be more open and honest, with unbiased responses.

A preferential voting system was used to rank the top three name ideas (in round four of phase two). This procedure assures that the most favored name be chosen.

Reilly states "preferential electoral systems come in a variety of formats. Voters rank-order candidates on the ballot paper in order of their choice, by marking a '1' for their most favored candidate, a '2' for their second choice. '3' for their third choice and so on. A candidate who gains an absolute majority of first-preference votes—as happens in roughly half of all cases—is immediately elected. If no-one has a majority, the candidate with the lowest vote total is 'eliminated' and his or her ballots re-examined for their second preferences, which are assigned to the remaining candidates in the order as marked on the ballot." (Reilly). The result is a "winner" that is most favored by the majority of voters.

Phase Two Results and Analysis

Round One Data

Round 1 of the survey was used to solicit name ideas. An email with a survey link was sent to 323 members of the IGAEA organization. The IGAEA Secretary compiled these member email addresses. Fifty emails were returned as undeliverable due to spam filtering and outdated or incorrect information. The survey was set up so participants could enter their name idea along with a rationale for that suggestion. Each surveyed could enter as many names and rationales as they wished. A follow up email and survey link was sent after one week. At the end of a two-week interval, 50 members had submitted name ideas with 93 total responses. Duplicate names were combined. Of the 93 responses, there were 18 with rationales to not change the name and there were 7 duplicate entries (same name idea), leaving a total of 68 name ideas to rate in round 2 (see Table 1).

Table 1: Unordered list of potential names with rationales from round 1 (unedited)	
Name	**Rationale**
Graphic Communications Educators Association	Graphic Communications certainly has replaced Graphic Arts in 21st century.
Graphic Communication Education Association	Graphic Communication is the modern adopted name for Graphic Arts Graphic Communication is not a major change from our current name, while being a more inclusive phrase for the emerging technologies we are incorporating in our programs. "Association" is a welcoming, traditional, perhaps even a timeless term. "Education Association" transcends a "school" mindset and is more inclusive of life-long learning.
Association of Media Production Education	AMPed...gets you fired up!
Graphic Communications Technology Association	Graphic Communications is still valid with both industry and education, and the word Technology defines production. In a global marketplace the use of International is no longer needed.
Communication Arts and Technology Educators (CATE)	Explains what we do, reaches out to design teachers, can be pronounced. Explains what we do...acronym can be pronounced.
International Graphic Communications Educational Association (IGCEA)	International Graphic Communications Educational Association (IGCEA) is more inclusive as to the scope of our members and representative of the industry we belong!
GCArts	Graphic Communication Association (& related technical studies)
International Graphics Association (IGA)	The name should be shorten (this is the intent of the change) having education in the title is not necessary as it is already confined to the educational arena.
Association for Visual Media Education	Visual media works. Could also be Association for Graphic Communication Education
Association of Communications Media and Imaging Technologies ACMIT	There is a need to address cross media communications through imaging technologies
International Digital Media Educational Association (IDMEA)	International Digital Media Educational Association (IDMEA) is more inclusive and current trends as to the direction of the industry we represent!
Association for Graphic Educators (AGE)	No response
Visual Communications Educators Association	No response
DigMED	Digital Media Educators
DMEA	Digital Media Educational Association (DMEA) is more current as to the direction of the industry we represent.
Graphic and Functional Imaging Education	Functional is a new term referring for non-graphic printing and imaging. This name is very futuristic, though a bit clumsy.
IGCDMEA	International Graphic Communications & Digital Media Educational Association (IGCDMEA) is more inclusive of current and feature scope of our members and representative of the industry we belong!
Graphics International Association (GIA)	No response
Association of Graphic Educators	Age? The name will never get old!
Graphics Association International (GAI)	No response
International Visual Communication Education Association	The membership scope of our membership has not changed, therefore International should remain in the title. Visual Communication suggests a broader range of content, processes, procedures, technologies, and media than the current title, Graphic Arts, suggests. Not including a descriptor such as "Technology" does not exclude membership from those engaged in teaching the more creative aspects of Visual Communications and may help to expand membership. Education Association is a more inclusive term than "teachers" "instructors" or "educators" in that membership is open to all supporters of the Education Process, not only those actually performing the instruction.

Table 1 continued: Unordered list of potential names with rationales from round 1 (unedited)	
Name	**Rationale**
International Association of Graphic Communications Educators	Because the title "Graphic Communications" is used throughout the IGAEA Constitution and Bylaws.
Graphics International	The name can include many of the allied industries, not just graphic arts.
Graphic Communications Education Association	This shortens the name, but still uses Graphic Communications which is not that familiar to most people. I have no issue with a name change, but I do believe it's important to select a name that will be comprehensive and long-lasting. There is little value in using the term "International" as part of the name. There have been but a few members over the past several decades of my involvement with IGAEA from countries outside of the USA including Canada. Also, if there are educators or industry people from other countries who are interested in joining a USA organization, they will -- they don't expect the term "International" to be part of the name. I know there are people out there who believe the term graphic communications is outdated and isn't well understood, but it is an excellent umbrella term that does and will continue to include all "visual" communications far into the future. Graphic - "Of or relating to written or pictorial reproduction." Communications - found under the term "Communication" 1." A system for communicating 2. The art and technology of communicating." Education - "The field of study concerned with teaching and learning." Association - "An organized body of people: society."
Digital Media Educators Association	More are familiar with digital media. Jerry Waite said he changed his major name to Digital Media and saw an increase in students.
Digital Imaging Education Association	Alternate - Association of Digital Imaging Educators Still has the concept of digital, but perhaps has a broader scope by including 'Imaging' in place of 'Media'.
International Graphic Communication Education Association No change or minor adjustment to current name	Ex: Graphic Communication instead of Graphic Arts. Communication processes will change as new methods are created.
International Visual Graphics Education Association	Keep the word "International", add "Visual" and drop "Arts" "Arts" is a word that for sure needs changing. It's sounds like a old trade name language. Is there a better word to replace Education?
International Visual Technology Education Association	"Visual" covers all areas. Everything now days relates to some kind of technology change/education.
No name entered	What are some of the titles/phrases of departments and/or job descriptions that the industry is using? Where and what type of jobs are the students going into. We also need to look into the future as to what will we be teaching 5, 10 years from now and beyond to keep up with industry changes. Do we know all the different types of industries that we may be educating our students for? Ink on paper is now only a very part of the picture.
Communications Technology International	Hopefully, broad enough to attract secondary school teachers teaching, art, drafting, printing.
Graphic Media Educator's Society	GMES
Graphics Educators International	It is the same name, just abbreviated, but it still reflects the membership as Graphic Arts teachers worldwide.
Graphics Technology Education Association	Drop International, drop arts. Igaea in neither international nor teaching art. It's technology driven.
Graphics Technology Education Affiliation	drop Association, it sound like a gated community.

Table 1 continued: Unordered list of potential names with rationales from round 1 (unedited)	
Name	**Rationale**
Graphics Education Nexus	Short and next generation.
Graphic Imaging Education Association	By using GRAPHIC in the name, we are being inclusive but specific with what type of imaging we are about and insuring that the creative and design aspect of our industry is being served. By using IMAGING we are being inclusive of methods for producing an image currently being used, but flexible to include imaging methods not yet being used or invented.
Education Association of the Graphic Arts	Placing Education first leaves no doubt that we are an association of educators, and the Graphic Arts is still an inclusive enough descriptor of our combined talents, sciences and methods
The Association of Visual Communication Educators	This name although lengthy in its official rendering can be symbolized with the letters VCE. These three letters can be the foundation for a solid, easily identifiable logo and organization. Visual Communication Educators is inclusive to all those who teach the creative and technical aspects of our combined fields.
International Graphic Arts Educator Association	Leave old name because of brand recognition, cost of change.
Printing and Digital Imaging Education Association	"Printing" (rather than "arts" or "communication" or "media") has had a distinctive meaning for over 500 years; "Digital Imaging" was pioneered by the printing industry (during the 1970s digital imaging transformed the industry), so in one sense it is not new, but it sounds "modern" and therefore complements the traditional concept of printing. It demonstrates that we are a vibrant part of the present and future. "Education" and "Association", I think, have to be in the name somewhere, regardless of the final choice. Printing and Digital Imaging Education Association - PDIEA, is pronounceable.
International Graphic Communications Educators Association	We are doing more than just Graphic Arts. Graphic Communications is a broader term that includes web design, video, and packaging.
International Graphic Arts Educators	The first three of the four words carry an essential meaning for what the association has been, is, and will be. The word Association could be dropped if Education is replaced by Educators, which implies an association.
Visual Educators International	1 - Easy to remember. 2 - Recognizes the fact there are many different facets to the world of graphic communication education. 3 - Would open up the organization to a variety of other educational areas not currently included. 4 - Keeps the international aspect.
Graphic Educators International	1 - Easy to remember. 2 - Removes the term graphic arts which is somewhat limiting in the world of education. 3 - Would keep the international aspect.
Cross Media Educators Association	Our field is expanding beyond print, and cross media seems to be the emerging umbrella descriptor.
Association of Graphic Technology and Management	Nowadays creation of graphic products relies heavily on the use of technology. We produce graphic products--whether it is a design piece or photograph or full-color poster or card box--using technology. While using the latest technology, it is extremely important to learn/teach how to manage files, data, and resources. With the advent of digital printing, variable data printing, and web site development, managing files and resources is an essential skill. In addition, in a real life people work in a team on a certain project, so it is important to manage projects and team members. The suggested name, Association of Graphic Technology and Management, aligns with what we do. Technology and management are integral parts of graphics. It has potential to attract a wide range of audience. Moreover, the graphic department is usually placed in either technology or management college/school.
International Graphic Arts Education Association	See rationale description stated in No.1 The present name represents international meaning world wide. The term Graphic Arts includes all phases of the industry including graphic design to putting ink on paper with a press and to electronic imaging and printing of a graphic image.

Table 1 continued: Unordered list of potential names with rationales from round 1 (unedited)	
Name	**Rationale**
International Imaging Association (IIA)	International-to be all inclusive or perhaps Universal. Whatever qualifies as "image producing" regardless of process is included. Association -a group of like-minded individuals and institutions that recognize the technical and social ramifications of producing images.
Graphic Communications Association (GCA)	I have no issue with a name change, but I do believe it's important to select a name that will be comprehensive and long-lasting. There is little value in using the term "International" as part of the name. There have been but a few members over the past several decades of my involvement with IGAEA from countries outside of the USA including Canada. Also, if there are educators or industry people from other countries who are interested in joining a USA organization, they will -- they don't expect the term "International" to be part of the name. I know there are people out there who believe the term graphic communications is outdated and isn't well understood, but it is an excellent umbrella term that does and will continue to include all "visual" communications far into the future.
Media Technology Association	IGAEA needs to implement a change to retain and gain membership. I'm sure that most comprehensive high school programs have had to make changes in order to retain and attract students and keep their programs from being eliminated. I'm not talking about tech centers, community colleges and universities although most have already made changes or are in the process. In Arizona, programs like graphic communications, graphic arts, photo imaging, graphic design, TV production, audio-visual technology, art and design technology are non-essential courses and can be sunset at any time. They are also old names with old standards. Our state hasn't made any change in standards for graphic communications (includes graphic arts, graphic design and photo imaging) in the past 12 years. Since standards are being worked on there are no suggestions (up-to-date standards for new teachers) on what to teach and there or no standardized tests to measure success. In order to attract 8th grade students and retain or interest those at our school it was necessary for to alter our program. Looking at today's hardware & software is an indication as to what's happening and what should be considered for high school programs.
The Association of Digital and Graphics Communication	Virtually all of Graphic and related disciplines are digital. This name better expresses the 21st century status of the discipline.
Visual Communication Education Alliance	The terms "visual" and "communicate" are used in one or both of the names of our organization's official publications. It is a common thread in the technologies of the past and the future. It is my understanding that when we changed our name to the IGAEA, Visual Communication was a close second to the choice of Graphic Arts. "Alliance" feels like a fresher & stronger term than "Association" "Education Alliance" transcends a "school" mindset and is more inclusive of life-long learning.
Visual Communication Education Association	The terms "visual" and "communicate" are used in one or both of the names of our organization's official publications. It is a common thread in the technologies of the past and the future. It is my understanding that when we changed our name to the IGAEA, Visual Communication was a close second to the choice of Graphic Arts. "Association" is a welcoming, traditional, perhaps even a timeless term. "Education Association" transcends a "school" mindset and is more inclusive of life-long learning.
Organization of Graphic Media Educators	"Graphic Media" combines traditional terminology with a more inclusive term for the emerging technologies we are incorporating, and anticipate incorporating in our programs. "Organization" feels like a coordinated and established structure. "Educators" identifies us as teachers.

Table 1 continued: Unordered list of potential names with rationales from round 1 (unedited)	
Name	**Rationale**
Visual Communication Education Group	The terms "visual" and "communicate" are used in one or both of the names of our organization's official publications. It is a common thread in the technologies of the past and the future. It is my understanding that when we changed our name to the IGAEA, Visual Communication was a close second to the choice of Graphic Arts. "Group" is a comfortable and classic term. "Education Group" transcends a "school" mindset and is more inclusive of life-long learning.
Organization of Visual Communication Educators	The terms "visual" and "communicate" are used in one or both of the names of our organization's official publications. It is a common thread in the technologies of the past and the future. It is my understanding that when we changed our name to the IGAEA, Visual Communication was a close second to the choice of Graphic Arts. "Organization" feels like a coordinated and established structure. "Educators" identifies us as teachers.
Graphic Communication Education Alliance	Graphic Communication is not a major change from our current name, while being a more inclusive phrase for the emerging technologies we are incorporating in our programs. "Alliance" feels like a fresher & stronger term than "Association" "Education Alliance" transcends a "school" mindset and is more inclusive of life-long learning.
Graphic Communication Education Group	Graphic Communication is not a major change from our current name, while being a more inclusive phrase for the emerging technologies we are incorporating in our programs. "Group" is a comfortable and classic term. "Education Group" transcends a "school" mindset and is more inclusive of life-long learning.
Organization of Graphic Communication Educators	Graphic Communication is not a major change from our current name, while being a more inclusive phrase for the emerging technologies we are incorporating in our programs. "Organization" feels like a coordinated and established structure. "Educators" identifies us as teachers.
Graphic Media Education Alliance	"Graphic Media" combines traditional terminology with a more inclusive term for the emerging technologies we are incorporating, and anticipate incorporating in our programs. "Alliance" feels like a fresher & stronger term than "Association" "Education Alliance" transcends a "school" mindset and is more inclusive of life-long learning.
Graphic Media Education Association	"Graphic Media" combines traditional terminology with a more inclusive term for the emerging technologies we are incorporating, and anticipate incorporating in our programs. "Association" is a welcoming, traditional, perhaps even a timeless term. "Education Association" transcends a "school" mindset and is more inclusive of life-long learning.
Graphic Media Education Group	"Graphic Media" combines traditional terminology with a more inclusive term for the emerging technologies we are incorporating, and anticipate incorporating in our programs. "Group" is a comfortable and classic term. "Education Group" transcends a "school" mindset and is more inclusive of life-long learning.
Imaging Technology Education Group	Inclusive & techy, with a pronounceable acronym
Imaging Technology Education Partnership	Inclusive & techy, with a pronounceable acronym.
Pixel & Dot Education Alliance	Basic building blocks of all that we may teach.
Pixel & Dot Education Group	Basic building blocks of all that we may teach.

Table 1 continued: Unordered list of potential names with rationales from round 1 (unedited)

Name	Rationale
International Visual Communications Educators Association	Similar to the current name but encompasses the whole industry as we know it today in the 21st century.
Communication Media Technologies Education Association (CMTEA)	I attended my first IGAEA Conference 33 years ago and this organization has fostered a unique relationship for secondary and post secondary Graphic Arts educators and the related industry. Few educational associations in any of the disciplines have enjoyed the fellowship and friendships that IGAEA has provided. It is time to move the organization and traditions into the future. For the last two years I have worked with the Arizona Department of Education to create new educational standards and outcomes for the secondary Graphic Communications and related cross media programs. This past month we have finally agreed upon those standards and a new name... Communication Media Technologies. There are core standards that apply for the following programs, and then a set of unique standards for each of the programs. 1. Animation 2. Broadcast Television and Film 3. Digital Photography 4. Digital Printing 5. Graphic Design/Web Design 6. Journalism, Yearbook/Newspaper 7. Music and Audio Production I support the name change for IGAEA, and would propose a name similar to Communication Media Technologies or Media and Communication Technologies. Analog to digital is complete and thus there is no need to put digital in the association title, understanding that some programs will use digital in their titles. Arizona State University uses Graphic Information Technology and thanks to sage advice from RR Donnelley the curriculum has been cross media for over ten years.

The survey also included space for those who wished to comment on why the name should not be changed. The committee decided to maintain a running commentary on why the name should stay the same throughout the survey process. Table 2 shows the initial listing of member comments.

Table 2: No name change comments from round 1 (unedited)

- The name is accurately descriptive as is.
- Not necessary.
- Fits full description of conferences and conference sites. Especially when we went to England and met with 17 couples from England to conference with.
- I've been a member for 41 years and am glad to have known the founding members and authors of textbooks from this organization.
- Why fix what's not broken?
- Tradition. People already know it. It's paid for.
- No name change needed
- Leave old name because of brand recognition, cost of change.
- Need a good reason to change.
- Why change the name? If it has worked then don't fix it.
- Keep the name, since it fits all areas of the Graphic Arts!
- I work in a library. It is a pain when companies change their names. Some publications will be cataloged under the old name, some under the new name. Because "education" is in your old name, it seems that a lot of colleges and schools would be impacted.

Table 2 continued: No name change comments from round 1 (unedited)

- I believe the name (IGAEA) should remain as is. When you break down International (covers the United States and all areas outside the United States), Graphic Arts (covers all areas of this great industry), Education Association (covers the teaching aspect of graphic arts).
- The present name represents international meaning worldwide. The term Graphic Arts includes all phases of the industry including graphic design to putting ink on paper with a press and to electronic imaging and printing of a graphic image.
- The conference has been 86 years in existence and is well branded! I could see a redesign of the logo but not a change of name.

Round Two Data

Round 2 of the survey was used to rate and comment on the name ideas gathered in Round 1. An email and survey link was again sent to the IGAEA membership requesting they rate the 69 collected unordered name ideas, with the goal of arriving at ten top rated names. The top of the survey included the comments from round one on not changing the name and space to add to these comments.

Next, a list of the 69 name ideas and rationales were presented with a Likert-like scale including, 1 (poor); 2 (fair); 3 (neutral); 4 (good); and 5 (excellent). A follow-up email and link were sent after one week. At the end of two weeks, the data was collected the scores were tallied and the point average was used to determine the rating, and the top rated ten names were identified (see Table 3). Though 145 individuals launched the survey, only 64 people responded to the lengthy survey.

Table 3: Ordered list of top ten rated names, rationales, and comments collected from round 2 (unedited)

First ranked name		Rating
Graphic Communications Educators Association		3.33 n=64

Comments

- It also shortens the number of letters making it easier to say GCEA.
- Graphic Arts still applies as does Graphic Communication. Besides, Graphic Communications (with an s at the end is grammatically incorrect. It is Graphic Communication. It is a singular discipline among many communications (with an s) disciplines. For example, Speech Communication, Small Group Communication, Non-verbal Communication, Organizational Communication, Graphic Communication, and so on. Individually they are singular. Collectively they are plural. Yes, I know, many in our discipline violate this simple grammatical rule.
- Graphic Communicatiaons makes good sense. Think about how we are bombarded with Graphic Communication everyday through a variety of mediums.
- Still cumbersome without conveying international.
- Does not roll off the tongue.
- It is important to use the term Communications as it relates to a system for communicating and the art and technology of communicating
- Needs International in front of it. More status and better represents population.
- It alienates industry
- International component of organization?
- It needs the International, but then we get into the IGCEA and trying to remember that. The word educators would imply excluding student articles which are published
- It's clear.
- Communications is a more accurate word for what we do, HOWEVER is one word worth the process of an entire name change?
- How about starting with International?
- Caution: there's no standard terminology for all relevant courses and programs.
- Name sounds great as an acronym

Table 3 continued: Ordered list of top ten rated names, rationales, and comments collected from round 2 (unedited)		
Second ranked name		**Rating**
Graphic Communication Education Association		3.23 n=64
Comments • Could work but a change is really no necessary. • This will include the people who are not educators but associated with GCOM. • Still cumbersome while still losing international. • Does not roll off the tongue. • This name should read Graphic Communications Education Association (I believe it was originally stated as Communications. • Needs International in front of it. More status and better represents population. • Should be Communications- there is more than one way we communicate! • Its less alienating than Educators • International component of organization? • This is good as well, and will take into account student articles • I prefer education over educators due to its broader meaning. It suggests a body of knowledge, in addition to the practitioners. • The 's' in Graphic Communications has become far more critical than ever before because of the cross media approach to the discipline. • Communication is a more accurate word for what we do, HOWEVER is one word worth the process of an entire name change? • I thought Graphic Arts was a modern name for Graphic Communications. And the arts includes digital as well as printed material. • But not worth the risks. Spend your efforts on active member recruitment. • The communicator is the author, not the means of production. The US Government still says that printing is a manufacturing industry. The largest association in the industry is PRINTING Industries of America. • The first two would sound better if combined to be 'Graphic Communication Educators Association'. • Needs the 's' on Communications to show a multifaceted organization. • Communications needs to be plural. • No benefit and all the above risks/threats and loss of Int. • Okay but why change? • Communications communicates no more than does Graphic Arts. No value in transcending schools because teachers work in schools. • Ok. Must be communications.		

Table 3 continued: Ordered list of top ten rated names, rationales, and comments collected from round 2 (unedited)

Third ranked name		Rating
International Graphic Communications Educational Association (IGCEA)		3.03 n=64

Comments

- Adequate in meaning, but it is more cumbersome than the status quo.
- Does not roll off the tongue.
- If the term International is important
- How about adding Educators instead of Educational?
- Communications is more current than Arts but this doesn't shorten the abbreviated title.
- It's just as bad as IGAEA
- No reason to change to this if its still going to be that long and cumbersome.
- I think what we do is still an art not a communication
- The only viable good choice, but I'd change Educational to Education
- Communication is a more accurate word for what we do, HOWEVER is one word worth the process of an entire name change?
- How about International Graphic Communication Educators Association?
- bad grammar! It's not an educational org.
- Closest to our current name.
- Not enough of a change to warrant the process. Too long.

Fourth ranked name		Rating
International Association of Graphic Communications Educators		2.92 n=64

Comments

- This could work if you drop the s from Communications. We are supposed to be scholars, intellectuals, and critical thinkers. Let's be grammatically correct.
- This name suggestion is not inaccurate, only longer with no significant improvement.
- Does not roll off the tongue.
- Take out the 's' in 'Graphic Communications' and I am on board.
- Doesn't shorten the abbreviated title.
- No benefit and all the above risks/threats
- Take off the 's' at the end of Communications.

Table 3 continued: Ordered list of top ten rated names, rationales, and comments collected from round 2 (unedited)

Fifth ranked name		Rating
Graphic Communications Education Association (GCEA)		2.79 n=64

Comments

- If you drop the s from Communications.
- Because Education Association constitutes half of this name, it is more prominent. Because these two words are typically the last two words of a teachers' union, we may not want to go there.
- Does not reflect worldwide interest.
- We still need to represent the manufacturing portion of the industry-PRINT!
- Take out the 's' in Graphic Communications and I am enthusiastic.
- No benefit and all the above risks/threats
- Similar to IGAEA. Not overly creative.
- Without the s.
- Perhaps Graphic Communications Educators International. We do have many, but we do have some members who are outside the U.S.A.
- Ok.
- With the options on the Internet we should become more International now as compared to our past.•Needs International in front of it. More status and better represents population.
- Good, include international.
- International component of organization?
- I think this name fits a lot of the criteria.
- Maybe we should look into the word International and make a change if this word is not representing as to who we are!
- Strong rationale.
- Communications refers to: 1. A system for communicating and 2. The art and technology of communicating. I found it interesting going through the "American Heritage Dictionary" and looking at words we tend to use related to our field of study. The words "Graphic Communications Education Association" seemed to stand out. The word International may or may not be incorporated as it does not reflect the primary name, but it may be considered needed.

Sixth ranked name		Rating
International Graphic Communication Education Association		2.78 n=64

Comments

- Okay.
- There is nothing new about evolving processes and technology.
- Since the 1970s, Graphic Arts processes have been changing so much and so fast that printers have struggled to stay current.
- OCR, digital prepress and platemaking, remote proofing, "green" inks, color management, JDF, and MIS--just to name a few.
- International graphic communication education association?
- Does not roll off the tongue.
- International Graphic Communications Education Association is only viable name to consider.
- Need more of a change.

Table 3 continued: Ordered list of top ten rated names, rationales, and comments collected from round 2 (unedited)		
Seventh ranked name		**Rating**
International Graphic Communications Educators Association		2.69 n=64

Comments

- Then why change?
- There is nothing about Graphic Arts that excludes web design and packaging.
- Does not roll off the tongue.
- If the term International is needed.
- Perfect!
- Communications is more current than Arts but this doesn't shorten the abbreviated title.
- I prefer education over educators — more inclusive.
- No benefit and all the above risks/threats
- Take off the 's' at the end of Communications.

Eighth ranked name		**Rating**
Graphic Communications Association (GCA)		2.68 n=64

Comments

- There is little value in using the term "International" as part of the name. There have been but a few members over the past several decades of my involvement with IGAEA from countries outside of the USA including Canada. Also, if there are educators or industry people from other countries who are interested in joining a USA organization, they will -- they don't expect the term "International" to be part of the name.
- I know there are people out there who believe the term graphic communications is outdated and isn't well understood, but it is an excellent umbrella term that does and will continue to include all "visual" communications far into the future.

Ninth ranked name		**Rating**
International Visual Communication Education Association		2.60 n=64

Comments

- Could work but not necessary.
- I do not see the distinction between Visual and Graphic, much less the advantage of one over another. The name suggestion is not inaccurate, only longer with no significant improvement.
- Does not roll off the tongue.
- Too long
- Covers it all
- IGAEA includes visual communications but I don't think that is a broad enough term to encompass all of our fields. This name is still a mouthful.
- This was a name we talked about in the past.
- Doesn't shorten the abbreviated title.
- Although somewhat long and no good acronym, it's a good grouping of accurate words.
- This says it all!
- Strong rationale.

Table 3 continued: Ordered list of top ten rated names, rationales, and comments collected from round 2 (unedited)		
Tenth ranked name		**Rating**
Association of Graphic Educators		2.58 n=64

Comments

- But the educators will!
- The word Association is not necessarily essential.
- Worldwide left out.
- Short, simple and spells AGE.
- The word Graphic used to be a great word, but we are changing and maybe need to move away entirely from graphic and graphic arts.
- Needs International in front of it. More status and better represents population. We still need to represent the manufacturing portion of the industry-PRINT!
- Add communication after Graphics and it works.
- Loses the Int.

Additionally, the comments for no name change grew from round one to round two. Note that multiple comments, in some instances, came from the same source, but are left here ungrouped. Some of the comments were for a name change and some against (see table 4).

Table 4: No name change comments from round 2 (unedited)

- No need to change the name
- They have a point, but some people try to say it as a word. For example, ATMAE is pronounced as AT-MAY. Try to say IGAEA, or as some may say I-GE-A. And to tell someone you are a member of IGAEA, is a mouthful.
- After reading many of the reasons not to change the name, it makes sense to me to keep the name, but update the logo. Even though most members are within the United States, we are preparing students for a global economy which makes sense to keep the word International. Graphic Arts covers all areas of imaging from design to a finished product. Education Association is what we are, Educators who belong to a teacher association. I say lets keep it.
- Ever since my first conference in 1975, I have been pleased with the operation of IGAEA and its annual conference. I have attended continuously, except for the cruises, since and have kept attending even after retiring from teaching.
- After reading the nominations, it is clear that the suggested new words do not add meaning, and usually at the expense the concept of international.
- The present name represents international meaning worldwide. The term Graphic Arts includes all phases of the industry including graphic design to putting ink on paper with a press and to electronic imaging and printing of a graphic image.
- It is time to reflect the change that has taken place
- Keep IGAEA
- I am also in support for leaving the name of the association the same. However, I will look at the options with an open mind.
- I actually agree with most of these comments. I heard at the conference last summer that people wanted to change it because it was hard to say. I have been a member for 35 years and never had a problem saying I-G-A-E-A and I think it is insulting when some person wanting to change the name mumbles the letters and say is is a bad name. I would vote to keep it, but I will fill out the survey so at least the second best choice might be picked.
- It needs change. IGAEA is awkward! It is hard to memorize as an acronym. There may be international membership, but we operate on a national basis.
- I can live with it.
- When I look at the new names being suggested, I can not find one that would accurately allow the general public to know what we represent, other than education. Many of the names suggested are terms that we in the industry know, but would be foreign to those not in our industry. When the Agriculture or the Automotive industry use those terms to describe their organizations, everyone knows who they represent. Therefore, I suggest a name that represents the printing, design, and publishing industry, and educators be chosen, so that the average person knows who we represent. The term Graphic Arts in our current name did not mean much too many people, as I often had to explain what it was. Rather than change it to another name that I would have to explain what it was, I suggest no change in our name.

Table 4 continued: No name change comments from round 2 (unedited)

- I can't argue with that, except we are beyond the Arts When something works, let it work and promote more.
- I agree that no change should be made. It has existed for many years and accurately represents what the Association is.
- We can get very accustomed to terms without thinking about the actual meaning. The term graphic arts, in our case, grew out of the manual arts in the early 1900s and later the industrial arts in the 1950s and 60s. Graphic arts was applied in that way, as craftsmanship in mechanical systems, with a focus on type composition, printing, and finishing. The term does not reflect the current discipline, which includes systems integration, cross media, information technology and communication technology. The AIGA.org American Institute of Graphic Arts has 22,000 members and is comprised of graphic designers. What that what we are? Our state has many high school programs in Digital Media with teachers that DO NOT see a connection with IGAEA, and the Graphic Design program is in the art department with teachers belonging to AIGA.A new name is a start to refocus our organization on a broader audience who deal with digital video, audio, digital publishing, information technology like XML publishing.
- This isn't necessarily a comment for no name changes, but an overall synthesis of the names I am seeing here combined with the trends that I am noticing in secondary and post secondary education. Many of the programs that I have been visiting and reviewing online have been making an effort to retool their images and programs through the inclusion of additional coursework including web development, video, audio, animation, and e-publishing. We as educators can see the connection between the emerging media, but unfortunately the general feeling of the web is that graphic arts is narrowly defined as dealing with ink and media. I don't see any issue with adding the terms like media or digital simply because a number of the process that we teach have now become automated or assisted by technology. We should also stay abreast of the trends we are seeing with our partner organizations as well. Print Industries of America and GATF have undergone name changes recently as well as other organizations I am a part (like ATMAE). IGAEA brand or images is well established, but if it is not attracting new members then something should be resolved.
- I agree that no change should be made. It has existed for many years and accurately represents what the Association is.
- We can get very accustomed to terms without thinking about the actual meaning. The term graphic arts, in our case, grew out of the manual arts in the early 1900s and later the industrial arts in the 1950s and 60s. Graphic arts was applied in that way, as craftsmanship in mechanical systems, with a focus on type composition, printing, and finishing. The term does not reflect the current discipline, which includes systems integration, cross media, information technology and communication technology. The AIGA.org American Institute of Graphic Arts has 22,000 members and is comprised of graphic designers. What that what we are? Our state has many high school programs in Digital Media with teachers that DO NOT see a connection with IGAEA, and the Graphic Design program is in the art department with teachers belonging to AIGA.A new name is a start to refocus our organization on a broader audience who deal with digital video, audio, digital publishing, information technology like XML publishing.
- This isn't necessarily a comment for no name changes, but an overall synthesis of the names I am seeing here combined with the trends that I am noticing in secondary and post secondary education. Many of the programs that I have been visiting and reviewing online have been making an effort to retool their images and programs through the inclusion of additional coursework including web development, video, audio, animation, and e-publishing. We as educators can see the connection between the emerging media, but unfortunately the general feeling of the web is that graphic arts is narrowly defined as dealing with ink and media. I don't see any issue with adding the terms like media or digital simply because a number of the process that we teach have now become automated or assisted by technology. We should also stay abreast of the trends we are seeing with our partner organizations as well. Print Industries of America and GATF have undergone name changes recently as well as other organizations I am a part (like ATMAE). IGAEA brand or images is well established, but if it is not attracting new members then something should be resolved.
- Since the vote will ultimately be: A-Keep IGAEA or B-Chose the New Name finalist; and our organization has already had three names so far, let's try to see if we can come up with something better. If not, vote to keep the original name. If we get something better, then let's move forward. After reading the submissions, how about adding Pixel & Dot in front of IGAEA as: Pixel & Dot: The International Graphic Arts Education Association
- Great feedback, I only wish that Graphic Arts programs at the Secondary, Community College, and University levels would survive future administrative scrutiny. Life was easier in the past, if change is not embraced; I fear many programs will be eliminated.
- IGAEA fits perfectly to our teaching profession. Don't change what has worked for over 8 decades.
- Many people have said that International is needed in the name. I disagree. International is assumed in many of today's organizations--case in point TAGA is more heavily participated in outside the US than inside. And it doesn't have International cluttering up the name!
- Don't see the need for change.
- I think the above statements pretty well make the case for no change. Developing new name recognition will take years. The cost and confusion that's inevitable can hardly yield a sufficient benefit to warrant the negatives.
- YES, LEAVE THE NAME AS IS. LOT OF GOOD NAMES BELOW, BUT IGAEA SAYS IT ALL.
- The time is right for a change and the name wasn't always IGAEA
- I can't argue with that, except we are beyond the Arts

Table 4: Continued: No name change comments from round 2 (unedited)

- I AM HAPPY TO BE ASSOCIATED WITH THIS ORGANIZATION WITH THE NAME AS IS. BUT, I ALSO UNDERSTAND THE RELEVANCE IN NEEDING A MORE CURRENT NAME.
- I have been an IGAEA member since 1963. IGAEA has met and continues to meet the recognition test of time. Visual Communication was a name that was promoted a few decades ago, but most believed it to be too broad in meaning.
- Name change fads come and go. For example: Industrial Arts to Industrial Technology to Technology Education to ad infinitum. Keep one constant and you keep your identity for those attempting to find you.
- As a new member who has attended only one conference, I don't feel that my opinion on this issue should carry any weight. I did speak up about how the word 'International' had scared me off during my first few years of teaching. But after meeting the members and understanding the organization, I think it is worthy of the 'International' label..

Round Three Data

An email and survey link was again sent to IGAEA members. The top ten name ideas and rationales were listed along with comments from the previous round. A Likert-like scale was again used to rate the name ideas. A follow-up email was sent after one week and at the end of two weeks, the data was collected the scores were tallied, from which the top three names were identified (see table 5). While 149 members launched the survey, only 86 responded to the names with ratings.

Table 5: Ordered list of top three rated names, rationales, and comments from round 2

First ranked name		Rating
Graphic Communication Education Association		3.28 n=86

Comments from Round 3:

- Shortens the name nicely. No international aspect, but not certain that's needed.
- "Education" instead of "Educators" broadens, but also weakens, the targeting.
- DuPont invented the term "Graphic Communications" (with the 's') in 1969 It STILL has to be explained. On the other hand, graphic communication does have a much more sensible meaning in some countries: it means using graphs, schematics, diagrams and the like to communicate ideas in this form rather than (or in addition to) words, i.e. written communication.
- Needs to be plural.
- Not better than current Name.
- Only if the term "Communications" is used instead of communication because communications refers to: A system of communicating and also the art and technology of communicating; therefor, it should be "Communications"
- Communication needs an s and the organization is for educators. Education implies that it's for anyone who wants to learn more about graphic communications.
- Although I see Haavey's reasoning for "communication" for his/their purpose, since they are in the "Communication" college at CalPoly--a rare placement for our programs — we have many ways of communicating graphically, so "Communications" is the only way to go. For decades, one program uses singular while all others are plural.
- International Graphic Communications Education Association is small change, yet allows great new promotional opportunities.
- To "s" or not to "s".
- I like the acronym GCOM. I am indifferent on "communications " v "communication"

Table 5: Continued: Ordered list of top three rated names, rationales, and comments from round 2		
Second ranked name		**Rating**
Graphic Communications Education Association (GCEA)		3.17 n=86

Comments from Round 3:

- 'S' Same as previous response.
- Shortens the name nicely. No international aspect, but not certain that's needed.
- Remove the "s" in "Communications" so that it reads properly.
- Add International.
- Keep it plural because it covers a range of areas in the communications industry, as well as education.
- Not better than current name.
- If you drop the 's's from
- One of the better choices, but we may have painted ourselves in a corner.
- Awkward.
- International" adds to the name clout.

Third ranked name		**Rating**
International Graphic Communication Education Association		2.98 n=86

Comments from Round 3:

- Why change? Just as hard to memorize as IGAEA
- Not enough of a difference to warrant the name change.
- Fails the "can I say it out loud" test.
- Needs to be communications, we are communicating in more than one way.
- Still too long.
- Not better than current name.
- Must be Communications".
- Cumbersome.
- Add the "s" on Communication and go with it.
- Same problem "mouthful". No substantial improvement from current title.

Round Four Data

Round 4 of the survey was used to present the top three names for ranking. As previously described, preferential voting was employed in this survey to arrive at the most favored of the three remaining names, listed here alphabetically:

- Graphic Communication Education Association
- Graphic Communications Education Association
- International Graphic Communciation Education Association

An email and survey link was once again sent to the IGAEA membership, this time requesting that they rank the top three name ideas with the goal of arriving at one most favored name. "Sometimes the words *ranking* and *rating* are used interchangeably, even though there is a distinction. The difference is simple: a rating question asks you to [evaluate] items using a common scale, while a ranking question asks you to compare…items directly to one another" (Vovici).

It was explained that to be included in the results, all three names had to be ranked by order of preference (in a 1, 2, 3 order). Depending on perspective the ranking would be least objectionable (1) to most objectionable (3) or most favorable (1) to least favorable (3). An email reminder was sent to ensure everyone understood the ranking process. At the end of two weeks, the data was collected.

There were 122 total respondents in this round, 10 who did not complete the 1, 2, 3 ranking fully and 17 who had duplicate entries (voted twice), leaving 95 respondents. According to preferential voting tabulation, and because no one name scored more than 50% of first place votes, a redistribution of the 2nd and 3rd place votes of the name receiving the lowest number of first place votes was tabulated. *Graphic Communication Education Association* received the lowest percentage of first place votes (23%), and so those voters who chose this name as their number one ranked name had their 2nd ranked and 3rd ranked name votes assigned to *International Graphic Communication Education Association* and *Graphic Communications Education Association*, tabulation respectively. Table 6 displays the new totals for the top two name choices after redistribution.

Table 6: Final top two ranking after the name with fewest votes was redistributed

Name	Rank Order 1	Rank Order 2	Rank Order 3	n
Graphic Communications Education Association	48	28	19	95
Percentage	50.52%	29.47%	20%	99.99%
International Graphic Communication Education Association	47	26	22	95
Percentage	49.47%	27.36%	23.15%	99.98%

Phase Three

Ballots were mailed to the entire IGAEA membership in May of 2013. The vote was to change the public name (Doing Business As) from International Graphic Arts Education Association (IGAEA) to Graphic Communications Education Association (GCEA). According to IGAEA bylaw, two-thirds majority of the ballots received, which have been postmarked within twenty days of the date of the ballot mailing, would be required to approve a change of name. Voting was compiled in June of 2013, with 95 votes tallied: 64 voted for the name change and 31 against. Thus, the change of name was approved by the membership by supermajority. According to plan, one year was given to make the transition, which includes the legal process of filing a Doing Business As, design of a new logo, updating of the website, and updating of IGAEA forms and documents.

Conclusion

This article is meant to preserve and provide future generations with a record of the activities undertaken during the name change process. This process was intentionally designed so that no one individual or small group of individuals could drive a name change in a "top down" fashion. Rather, the process relied on a democratic and structured approach that harnesses the collective wisdom of members, with the belief that democratically arrived at group decisions tend to be better than individual decisions. In this case, the collective membership of IGAEA provided its own wisdom through member expertise and commitment to improving IGAEA and the educational community it serves.

Color Accuracy on Mobile Device Displays

by Stephanie Romero for Jerry Waite, Ed.D. • University of Houston

Introduction

At one time, a simple presentation of numbers, letters and icons was all that was needed on a mobile device. Technology has brought increased bandwidth, integrated digital cameras and streaming video to mobile devices. Contemporary mobile device displays are trying to fill the demand of the color-intense users. But are they? A variety of technologies for mobile displays are on the market today. The purpose of this study is to determine how faithfully these devices render color. The importance of this study is to illustrate the need for industry standards in color management on these small displays to keep up with the ever-changing technology. The primary hypothesis is that there is a large discrepancy between control image and rendered color. The secondary hypothesis relates to differences between same model device display colors.

This study has practical applications that could be helpful to an increasingly global populace of mobile users who could make decisions based on their mobile display's color. The problem is timely and needs to be addressed. Many could benefit from this research's findings and conclusions, such as mobile device manufacturers, content creators and designers.

Color Theory

Three essentials needed to produce color are a light source, an object, and an observer (X-Rite, Inc., 2004). Light is the part of the electromagnetic spectrum and is transformed into colors through wavelengths. Objects can reflect and transmit light, but this study focuses on the emissive light source of the mobile device displays. They have their own unique wavelength composition. This arrangement of wavelengths that leave a colored object can be measured with a spectrophotometer and is called spectral data or reflectance intensity (X-Rite, Inc., 2004).

In 1931, the International Commission on Illumination (CIE) established a color model that represents the visible spectrum based on the visual capabilities of a Standard Observer (a hypothetical viewer and common light sources). These two variables allow device and illuminant dependence. This first model was limiting in its chromatic definition. In 1976, the L*a*b* color model took a new approach that involved an opponent theory of color vision, which states that two colors cannot be both green and red (b*) at the same time, blue and yellow (b*) or light and dark (L*) at the same time (X-Rite, Inc., 2007). As a result, single values can be used to describe the opponent attributes, as seen in Figure 1.

The CIE 1976 L*a*b* color model illustrating the chromatic opponent theory. L* is the lightness, a* green (-) /red (+) and b* is blue (-)/yellow (+).

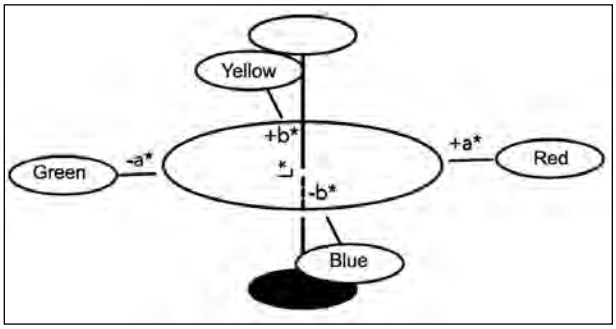

Figure 1

The L*a*b* color model is presently one of the most popular spaces for measuring object color and is widely used in virtually all fields (Konica Minolta, 2003). Spectral data measures the composition of light reflected from an object before a device interprets the color (X-Rite, Inc., 2004).

The assessment of color is usually an assessment of the difference (denoted as Delta) from a known standard. The CIE L*a*b* model illustrates the distance of the compared colors on the model diagram. The expressions for these coordinate color differences are:

- ΔL*—the lightness difference
- Δa*—red/green difference
- Δb*—yellow/blue difference (Datacolor, 2009)

Given coordinate values, the total difference or distance on the CIE L*a*b* diagram can be stated as a single value known as Delta E (ΔE). $\Delta E = [(\Delta L^2)+(\Delta a^2)+(\Delta b^2)]$sq root (X-Rite, Inc., 2007).

Mobile Display Technology Definitions

All mobile devices are direct view devices that are flat-panel, according to Louis Silverstein, who wrote Color

Display Technology: From Pixels to Perception (2006). He also states that one of the most active application markets driving advances to enhance color performance and improved image quality is the small, high-performance color displays for mobile devices. Combining successful technologies or creating new innovations has lead to many different display technologies with significantly different color characteristics to provide manufacturers with more competitive display solutions to provide a more positive user experience (Safaee-Rad, 2012).

These technologies include:

- Thin Film Transistor (TFT) LCDs are the most common type of display units used across mobile phones. TFT LCD offer better image quality and higher resolutions compared to earlier generation LCD displays but their limitation lies in narrow viewing angles and poor visibility in direct light or sunlight (Nairaland, 2012).
- In-Place Switching (IPS) LCDs are superior to normal TFT LCD displays with wider viewing angles and lower power consumption, which leads to a much improved battery life. IPS-LCDs are costly (Nairaland, 2012).
- Super Liquid Crystal Display (S-LCD) differs from a regular LCD in that it does not have an air gap between the outer glass and the display element and makes the user feel "closer" to the display (What is Super LCD?, n.d.).
- Organic Light Emitting Diode (OLED) is much better compared to LCDs because of their exceptional color reproduction, fast response times, wider viewing angles, higher brightness and extremely light weight designs (Nairaland, 2012).
- Active-Matrix Organic Light-Emitting Diode (AMOLED) displays have all the attributes of an OLED display like brilliant color reproduction, light weight, better battery life, higher brightness and sharpness and light weight designs (Huang, 2010).
- SUPER AMOLED or Active Matrix OLED is a version of AMOLED that integrates the touch screen layer directly into the display instead of overlaying it on top of the display, as has traditionally been done. (What is "Super AMOLED?", n.d.).
- Retina Display is a term used by Apple for its high resolution (640 x 960 pixels) IPS LCD (with backlit LED) used in the iPhone 4 and 5. It is called Retina display because its pixels cannot be individually identified by the human eye, thus making the display super sharp and brilliant (Nairaland, 2012).

Other terms:

- High Definition (HD) standards are 720 pixels HD &1080 pixels for FULL HD LCD.
- HD+ 720 pixels, which is 7% more pixels than HD (Nokia, n.d.).

Methodology

This focuses on the relationship of the mobile display's technology and how this technology accurately renders color. The dependent variable is control image color. The independent variable is change in mobile device. The control image color quality is a function of the mobile device and the differences will be examined. If there is a change in device, then there is an expected change in the control image color.

The primary hypothesis of the study was to find out if rendered color on the device displays is accurate to the original within a set tolerance. The secondary hypothesis relates to how much of a color difference there will be among same model mobile devices. The approach is to measure the emissive light from the mobile displays with a spectrophotometer. The spectral data was interpreted using the L*a*b* color space. The Delta E (ΔE) between the control image color and the rendered output color on the mobile device display was calculated, summarized and evaluated.

Table 1: Control image CIE L*a*b* color coordinates

Color	L*	*a	*b
White	100	0	0
Cyan	91	-51	-15
Magenta	60	93	-60
Yellow	98	-16	93
Red	54	81	70
Green	88	-79	81
Blue	29	68	-112
Purple	31	39	-45
Dark Skin	40	16	20
Light Skin	66	23	29
Gray	62	0	0
Black	0	0	0

Table 2: List of sampled mobile device displays and their characteristics

Manufacturer	Model	Pixel Density	Technology	Screen	Resolution
Apple	iPhone 3GS	163	LED-backlit with IPS	3.5″	320 x 480
Apple	iPhone 3GS	163	LED-backlit with IPS	3.5″	320 x 480
Apple	iPhone 4	326	Retina	3.5″	640 x 960
Apple	iPhone 5	326	Retina	4″	640 x 1136
Apple	iPad Mini	163	LED-backlit with IPS	7.9″	768 x 1024
Apple	iPad Mini	163	LED-backlit with IPS	7.9″	768 x 1024
Samsung	Galaxy S3 Phone	306	HD Super AMOLED	4.8″	1280 x 720
HTC	Windows Phone 8X	342	HD S-LCD 2	4.3″	1280 x 720
Nokia	Lumia 920 Phone	332	HD+ IPS LCD	4.5″	1280 x 768
Microsoft	Surface Pro Tablet	207.82	Full HD LCD	10.6″	1920 x 1080
Microsoft	Surface RT Tablet	148	Full HD LCD	10.6″	1366 x 768

The Control Image

The control image was created in L*a*b* color space. Table 1 shows the values used to create the 12 one-inch x one-inch patches of color. The image was saved as a high-quality jpeg with 72 ppi resolution.

The population is represented by a sample of 11 devices. The sample has some characteristics of the whole population. It includes five manufacturers, nine models types, and ten different types of technology. Seven of the devices generate emissive/luminescent light and four devices generate light from a separate non-emissive internal or external source (Silverstein, 2006). Table 2 gives the characteristics of this sample.

Assessments and Measures Instruments

To test the hypothesis, the control image was measured on each of the sample devices with an X-Rite i1Pro spectrophotometer and SpectraShop 4 software. The 1931 CIE 2° observer was used at an Illuminant of D65. The Delta E Lab 1.1 Apple iPhone Application by Mauro Boscarol was used to calculate the differences or distance between the control image's colors and the device's rendered colors. For assessment of the differences in this study, 4 Δ units will be the acceptable tolerance. Differences between colors in an image that are within 4 Δ units of each other are not visible to most viewers (X-Rite, Inc., 2004).

With the control image on the mobile device's display, the setting for auto-brightness was turned off and put at mid-level. Next, SpectraShop 4 software was launched and connected to the i1Pro set for emissive color measurement. For each color specimen, the name of the color was input. As each patch on the control image was measured, the data was saved for analysis.

Analysis of Results

The control image's L*a*b* color values from Adobe PhotoShop were recorded in a spreadsheet. The measured L*a*b* data was compared to the test image values and the difference calculated using the Delta E Lab 1.1 application. The light and chroma values are averaged, as well as the ΔE calculations each device.

The overall ΔE average of all the devices was 15.15, well below the benchmark of 4 Δ units. The most accurate devices were the Nokia Lumia 920 (7.93) and the HTC Windows Phone 8X (9.07). The rest of the device display ΔE's were greater than 12. The ΔL* alone (representing luminance accuracy) was better. Nine devices resulted in a ΔL less than four with an average of 1.78.

Table 3: Sample ranked by Delta E (ΔE)

Rank	Device	ΔE
1	Nokia Lumia 920	7.93
2	HTC Windows Phone 8X	9.07
3	Apple iPhone 4	12.34
4	Apple iPhone 5	14.01
5	Apple iPad Mini	15.01
6	Microsoft Surface Pro	15.84
7	Microsoft Surface RT	15.86
8	Apple iPad Mini	15.98
9	Samsung Galaxy 3S	19.41
10	Apple iPhone 3GS	20.30
11	Apple iPhone 3GS	20.93
	Average	15.15

The secondary focus was to determine if two devices of the same model would have a large color difference. Two iPhone 3GS and two iPad minis were measured. The iPhone 3GS showed more distance between color coordinates. The average ΔL was 4.14, Δa resulted in −2.03, Δb averaged to −6.83 and the ΔE distance was 20.85. Green, blue and magenta had the biggest differences. One device had better lightness and had better consistency with color. The two iPad minis were more consistent than the two iPhones. The magenta and blue had bigger ΔEs. The average ΔL was 1.63, Δa resulted in −6.67, Δb averaged to 2.37 and the ΔE distance was 5.49.

Conclusion

This study supports the hypotheses that rendering of color on mobile device displays is not accurate. Established earlier for assessment of the differences in this study, 4 Δ units would be the acceptable tolerance. None of the average Δs of any device was less than 4.

- The best display measured (lowest ΔE) is the Nokia Lumia 920 at 7.93.
- The top four devices all have pixel density greater than 300 and are all smart phones.

Overall, this study suggests that mobile device displays need to incorporate color management technology standards. Color management ensures optimum color reproduction regardless of devices used as long as the devices are characterized by an ICC (International Color Consortium) profile (Kipphan, 2001). Members of the ICC are exploring the needs of color-managed images on mobile devices, with consideration for authoring content for digital publications. Also, methods of controlling color on mobile devices and the hardcopy output from these devices are being researched (ICC, 2012). With the increased usage of mobile devices, the user should be aware of the inaccuracy of rendered color, no matter the technology being used.

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The Effectiveness of Copyright Protection for YouTube Video Content

by John Tran for Jerry Waite, Ed.D. • University of Houston

Introduction

Copyrighted video sharing has been a prevalent issue among media companies and the Internet community. The well-known video-streaming site YouTube is a common source for user-generated videos which incidentally lead to copyrighted content from television programs and movies. In response to these practices several year ago, television and movie producers made vocal complaints about the video site and accused YouTube of allowing its users to freely upload illegal copyrighted videos without repercussions. Starting in 2005, during its launch, YouTube garnered 6,000 video uploads each day and 2.5 million page views daily, but by 2006 over 70% of the most popular videos contained copyrighted material (Field, 2010). This issue has been the subject of numerous claims filed by media companies against YouTube in an attempt to either remove the illegal content from the site or shut down the video-sharing site entirely. Viacom International Inc., in particular, is most noteworthy for its lawsuit against YouTube in 2007 for alleged damages caused by copyright infringing videos on the site.

YouTube has responded to these accusations by claiming to have cooperated with copyright owners in removing illegal content from its site. The site has implemented several anti-infringement measures that allow content owners to report illegal videos and submit requests for deletion. In addition, fingerprinting technology has been used by YouTube to protect copyrighted content by blocking "identical uploads of previously removed material" (Field, 2010). Copyright law, specifically the Digital Millennium Copyright Act (DMCA), requires YouTube to comply with content owners giving notice to the site of infringing activity. At the conclusion of Viacom's lawsuit against YouTube in 2010, the courts ruled that the video-sharing site was successful in complying with the media company's request to remove 100,000 videos containing its copyrighted content within one day (Diaz, 2010). The courts also decided that "the burden to point out allegations of infringement is with the content provider, and the burden of taking down material lies with the service provider" (Diaz, 2010). Despite the ruling, Viacom has appealed the court's decision and continues to fight against YouTube with the strong belief that the video site had "willfully infringed" upon their rights (James, 2013). Other media companies share Viacom's sentiments and would benefit from knowing the true effectiveness of YouTube's copyright protection system in order to develop preemptive measures against possible infringement activity on the site. The copyright protection system includes video flagging, fingerprint technology, and copyright claims submitted by content owners.

Literature Review

Hunt (2007) argued that Section 107 of the fair use doctrine favors YouTube videos based upon four critical factors: purpose and character, nature, substantiality, and effect on the value of the copyrighted work. He supported his stance by describing YouTube content as being transformative without commercial motivation, factual-based, limited in length and quality, and having "no protectible derivative market" (Hunt, 2007, p. 221). Mellow (2007) added that YouTube videos are protected by the fair use doctrine because they are "not just for entertainment, but for the purpose of comment and criticism as well" (p. 201). These discussions aid the research by providing a detailed description of YouTube videos that are considered fair use and thus should not be classified with actual infringing content as potential deleted copyright violations.

Other scholars have explored possible solutions that can benefit both YouTube and media companies in an attempt to find a balance between copyright enforcement and innovation. Kim (2001) claimed that media companies can use YouTube to "effectively leverage their copyrighted material in order to share in online advertising revenue while simultaneously promoting their brands" (p. 171). Buckley (2008) suggested that both parties should turn to "negotiation, compromise, and the development of new business models" and avoid past mistakes that were evident in the conflict between copyright owners and Napster (p. 265). Allen (2007) added that both parties would look to "quantify the appropriate balance between innovation and protection in a settlement" with online video revenue at stake (p. 1053). These observations, while not directly related to the effectiveness of copyright protection, forecast a potential shift in the video-sharing culture and possibly alter the scope of future research regarding copyright and YouTube.

Methodology

This research measures the frequency of infringing content returned by the site's search feature, as well as the amount of time it takes for videos to be removed. Further, the research examines the effectiveness of YouTube's copyright protection system in protecting both high-valued and low-valued television programs. This research may provide media companies valuable insight into YouTube's takedown system.

The objective of this study was to detect copyrighted videos in a search that included four major sporting live events, three of which were Pay-Per-View (PPV) broadcasts. Viewership numbers and, in the case of PPV events, total sales were used to distinguish between high-valued and low-valued events. Each event was labeled A through D with A representing the highest-valued event and D representing the lowest. The events used for this study were (A) *NFL Super Bowl XLVII;* (B) *WWE Royal Rumble;* (C) *WWE Elimination Chamber;* (D) *TNA Wrestling Lockdown.*

Searches for the events were executed at several predetermined intervals after an event concluded its airing, usually at 10 p.m. Central Time. Intervals ranged from 30 minutes to one month removed from the conclusion of the event. For search sessions conducted within the 24-hour interval, results were sorted by upload date using YouTube's search options for efficient detection of newly uploaded copyrighted videos. For one-week intervals and beyond, normal search preferences were used for the corresponding sessions. After the searches were returned, the researcher browsed through a minimum of ten pages and recorded instances of videos with content from the televised sporting event being searched. Videos were tallied and added to a playlist to track the status of the video throughout the research.

In addition to recording the frequency of copyrighted videos returned by YouTube's search function, the research calculated the number of videos added and deleted since the previous session as well as the total number of videos discovered up to the current session. The number of added videos signifies how often users upload copyrighted content for a certain event at a given time. Deleted videos measure the tendencies of media companies in filing copyright notices and YouTube in fulfilling their requests. Videos currently online represent the efficiency of YouTube's copyright protection system in keeping illegal content from being accessible to public users. Sporting events that are most prone to copyright infringement are identified by the highest total number of videos discovered.

The searches followed strict criteria in which to regard videos as copyright violations most likely to be flagged for removal. Videos uploaded by certified channels of the copyright holder were dismissed for obvious reasons. Tallied videos were to be of acceptable quality in both picture and sound and should not hinder the watcher's viewing experience. The majority of the copyrighted content was to be presented as it was aired originally and should not contain original content, such as commentary or music, added by an outside party. The main emphasis of the searches was the live broadcasts of the sporting events and did not include reviews and recaps in the study.

Results

There were varying results among the four events. Event A, being the highest-valued event, was the top beneficiary of the copyright protection system, accounting for the highest ratio of videos deleted to videos tallied. In con-

Table 1: YouTube copyright protection trends for sporting events

Event		30 min.	1 hr.	2 hr.	12 hr.	24 hr.	1 wk.	1 mon.
A	+	4	4	2	3	1	0	2
	–	0	0	1	5	0	4	3
	0	4	8	9	7	8	4	3
	T	4	8	10	13	14	14	17
B	+	5	0	0	4	0	8	2
	–	0	1	0	1	2	3	7
	0	5	4	4	7	5	10	5
	T	5	5	5	9	9	17	19
C	+	0	0	1	6	7	7	3
	–	0	0	0	0	0	8	3
	0	0	0	1	7	14	13	13
	T	0	0	1	7	14	21	24
D	+	0	0	0	1	3	2	5
	–	0	0	0	0	1	1	3
	0	0	0	0	1	3	4	6
	T	0	0	0	1	4	6	11

Notes: + added videos. – deleted videos. 0 active videos. T total discovered.

trast, Event C garnered the highest number of copyrighted videos remaining active and the highest total discovered by search in a period of a month. The event with the lowest mainstream appeal and value, Event D, garnered the fewest number of copyrighted videos uploaded and active on YouTube. Complete data of the findings for this study is listed in Table 1

Several different assumptions can be drawn from these trends regarding the media company's stance towards infringing videos. The high numbers of Event C, classified as a low-valued event with high mainstream appeal, may be a product of the media company's lacking sense of urgency to protect "B-list" events as opposed to higher-priority marquee events. Its large user base would then have ample opportunity to maintain copyrighted content on YouTube with limited opposition from the copyright owner. As expected, Event A became the most protected event on YouTube due to higher mainstream appeal and value leading to strict copyright enforcement by the media company. Event D's low numbers may be the result of the media company's strict stance against infringement making videos harder to find online, or users did not have enough interest in the product to invest in uploading content. The true intentions of the media companies, however, are not definitively known, making these deductions inconclusive.

The results of this study also revealed several characteristics of YouTube's copyright protection system. On average, 17.75 videos were discovered in searches for each event throughout seven different intervals. There were 71 infringing videos discovered for all four events, and 62 percent of those videos were deleted by YouTube. In addition, the playlists maintained by the researcher revealed that a large majority of videos were deleted within one month from the initial upload date. These trends show that infringing videos have a maximum of a one-month lifespan before being removed from YouTube, which may be too long for media companies. This may be due to the users' resiliency in bypassing YouTube's system using unconventional methods or the lack of urgency by either YouTube or the media company in attending to the offending videos.

Infringing activity was shown to be most rampant after twelve hours from the conclusion of an event as evidenced by the high increase in added videos for subsequent intervals. Numbers for videos remaining active also showed that copyrighted videos were most likely to be found in searches between the 24-hour and one-week intervals. Considering factors for these trends include development and processing times to produce long, high-quality videos by the user as well as the user's intellectual tactics to wait after an extended period before uploading copyrighted content. Early data revealed that users were more likely to upload videos of Events A and B, high-valued events, during the periods between 30 minutes and two hours than they were with Events C and D, low-valued events. However, low-valued events became increasingly easier to find in searches after twelve hours while high-valued events became less frequent. The exception is Event B, which saw a sharp increase in online videos at the one-week interval before declining again afterwards.

There were various issues with completing this study in regards to recording accurate data. One of the main challenges was evaluating the quality of discovered videos to consider them as potential deleted content. Some videos appeared to be recorded from a live video stream that was played on the user's computer which, depending on the watcher's opinion, may or may not have deteriorated viewing experience. Other videos also contained foreign broadcasts of the events with non-English commentary, which may be an important factor in the watcher's viewing preferences. Users also had the tendency to distort the image and sound in order to bypass YouTube's detection system, causing the quality of the video to diminish slightly. Some of these videos were tallied despite the deficiencies in quality, as it was decided with the researcher's personal judgment that the videos were sufficient enough to present a similar viewing experience as that of higher-quality videos. As a result, some videos may have been mistakenly included in or omitted from the data in the research. Another element that was overlooked in the research was the view count for each YouTube video and the fact that some clips garnered significantly lower views than others. This may be due to a lack of interest by users in either watching the videos or browsing deep into extensive search results where the videos were located. Media companies may have considered these videos as non-threatening and chose not to take any action against them.

Conclusion

The data for this research suggests that YouTube's copyright protection system, while successful in removing more than half of infringing videos, was not efficient enough in responding quickly to copyright violations.

However, some factors need to be taken into consideration before regarding this study as an accurate summary of YouTube's system. It is unknown whether YouTube or the media companies were at fault for not acting promptly towards copyrighted videos uploaded to the site. As Diaz (2010) mentioned, "the burden to point out allegations of infringement is with the content provider, and the burden of taking down material lies with the service provider." Media companies may have different stances towards copyrighted videos, strict or lenient, which could have possibly affected the results of the study. The inconsistencies with judging the quality of videos was another critical factor as statistics may be skewed due to false flags or overlooked instances. This study also only focused on sporting events and did not take into account other common programs such as fictional movies and television episodes: these may yield different trends.

Additional research might include a similar study that improves and redefines criteria for determining actual copyright violations. Further research might also consider other factors, such as view count and video duration to target full-length videos. A larger sample size is also needed for a better assessment of YouTube's system. New research might also extend intervals to at least one year after an event's conclusion, as well as include additional televised programs with similar viewership numbers as those used for this study.

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Graphics

- Be sure that submitted tables and other artwork are absolutely necessary for the article.
- Write a caption for each graphic, include captions in a list at the end of your Word document.
- Electronic artwork is preferred and should be in PDF or TIFF format.
- Send all artwork files and hard copies of these files with your submission.

Tables

- Set up tables in separate documents, one document for each table.
- Do not attempt to make it "pretty." Use the default Word style "Normal" for all table text. Do not use any other formatting.
- Do not use hard returns inside the table ("enter" or "return").
- Get the correct information into the correct cell and leave the formatting to the designer.
- Tables will be formatted by the designer to fit in one column (3.1667" wide) or across two columns (6.5" wide).

Artwork

- Scan photographs at 300 ppi resolution.
- Scan line drawings at 800 ppi resolution.
- Screen captures should be as large as possible.
- Graphics should be sized to fit in either one column or across two columns.
  - One column is 3.1667" wide, two columns are 6.5" wide.
  - Graphics may be larger than these dimensions, but must not be smaller.

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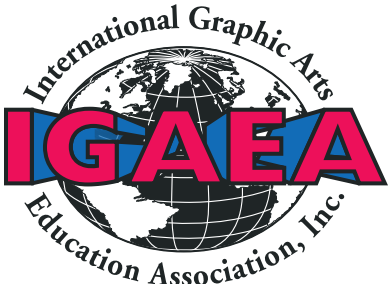

This cover was printed on the Xerox 700 Digital Press
at the University of Houston - College of Technology.