

# Evolving Print Industry Impact on Career and Technical Education



# The evolving printing industry and its impact on Career and Technical Education

#### **Executive summary**

If you're involved in Career and Technical Education (CTE), you are probably aware that until recently most programs tied to the Printing Industry revolved around the traditional offset printing process. While the offset printing industry is still a vibrant business that requires skilled trade workers, the fact remains that the printing industry is undergoing dramatic changes with the advent of software design tools and high speed digital printing. Most importantly, this new technology is transforming the workforce skills required to support the evolving printing industry. To understand how CTE can respond to keep pace with evolving industry needs, it will help to first highlight some of the changes taking place in the industry, then examine the new skills required and finally, explore the opportunity for CTE programs to meet the potential skills gap in the growing digital printing industry.

### Significant changes in one of the largest manufacturing sectors in the United States

Printing is the second largest manufacturing industry in the United States with annual printing shipments approaching \$200 billion. While more than one million people are employed in the printing industry, the investment priorities and job skills are clearly changing with the transition to digital technology. Andrew Paparozzi, chief economist of National Association of Printers & Lithographers (NAPL), recently presented on the growth factors and industry dynamics around the printing industry. His numbers make it clear that the highest growth in capital equipment investment will be related to the digital side of the printing industry. In fact five of the top six investment categories relate to hardware and software tied to digital. Investment in traditional offset technologies, such as presses, is lower on the list of priorities.

Most frequent cited priorities	Next 3 years	Next 5 years
1. Digital infrastructure, workstations, servers, etc.	55.1%	71.2%
2. Bindery/finishing equipment/systems	47.4%	43.7%
3. Web-to-print, e-commerce	42.8%	38.7%
4. Digital presses; variable	38.6%	41.7%
5. Mailing capabilities	34.4%	31.3%
5. Workflow solutions	32.6%	44.4%
10. Lithographic presses: 4 or more color	21.8%	23.8%
17. Lithographic presses: 2 color/B&W	13.2%	7.0%

The same study showed companies need to hire workers with new skill sets to meet the new demands of the printing industry.

Meanwhile, the Printing Industry Market Information and Research Organization (Primir) recently released a study on the impact of digital printing in the United States from 2009–2014. It projects a 0.3 percent drop in the total page volume of analog printing over this period of time compared to 15.9 percent growth in digital printing. It's still important to note that digital printing makes up only about 3 percent of the printing industry volume.

Another study by Printing Industries of America (Beyond the Horizon: Shaping Print Markets and printers over the next Decade, Ronnie Davis, 2009) came to a similar conclusion. It showed that in 2008, digital printing was about a \$20 billion industry, accounting for a small overall portion of the revenues generated by the printing industry. By 2020, the growth in digital print could add \$10 billion to annual industry shipments—growing 7 percent per year. At the same time, conventional printing is expected to decline more than 25% from \$127 billion to between \$87-\$100 billion.

These studies indicate that virtually all growth in the printing industry for the foreseeable future will occur in the digital printing segment. And since digital printing is currently still a relatively small percentage of the total printing market, the shift from analog to digital represents the beginning of a significant trend shift affecting operation through the industry.

#### When the marketplace changes, Career and Technical Education Programs respond

CTE programs are dedicated to preparing the workforce of the future. And now it's clear that the skill sets of individuals graduating from a CTE program tied to the printing industry must change to keep pace with changes in the industry. That means the curriculum must also evolve. Yet in reality, most schools will only invest in updating curriculum when they see changes in the job market.

#### The evidence is in

An April 2011 search of www.careerbuilder.com using the term "printing" yielded over 10,000 national jobs. Searching on the term "digital printing" provided over 1,600 job opportunities. That would indicate that roughly 16 percent of jobs are related to the newer digital trends in the printing industry. Yet, industry statistics show only 3 percent of the printing volume is based on digital technologies versus 97 percent for traditional offset. Hiring growth is trending toward digital, as 16 percent of the jobs are related to 3 percent of the volume for digital.

Another source of job data, <a href="http://www.Indeed.com">http://www.Indeed.com</a>, shows nearly 8,000 national jobs using the search term "digital printing" (http://www.indeed.com/g-Digital-Printing-jobs.html). Indeed.com reveals 330 digital equipment operator jobs alone (http://www.indeed.com/qdigital-print-operator-jobs.html). And this does not include the myriad of related jobs in graphic and digital document design. Career Builder also shows more than 2,500 job opportunities using the search term "graphic design". Many of these jobs are related to designing new materials that can take advantage of the digital printing process. And finally, the Washington Post shows over 1,000 jobs using the search term "digital printing" (http://nationaljobs.washingtonpost.com/a/ all-jobs/list/q-Digital+Print).

#### Hire for the Future, Not the Past

Recreating the labor force we had prior to the recession isn't going to be enough.

- Cultivate the new skills—business management, financial management, strategic planning, IT, marketing, consultative selling, etc.—our new industry requires.
- Cross-train to develop the flexible, adaptable work force that can be where we need them when we need them and to make labor more of a variable cost than a fixed cost
- "We're getting rid of folks who can't/ won't help advance the company."
- "The most signification change in my company is occurring in production, where the ratio of operators to thinkers is changing dramatically."

#### Why changes in printing technology require teaching new skill sets

The traditional printing industry, consisting mostly of offset printing technology, is a true skilled craft or trade. Offset printing presses, whether sheet-fed or web, have advanced significantly in terms of automation. However, they still require a skilled operator to run the press and all of its subsystems such as ink/water, paper feeding, drying systems, plate alignment, color balance and quality of output. Similarly, there are numerous pieces of bindery equipment that require skilled operators. Most of these skills are acquired in a trade school/program or through an on-the-job apprenticeship.

In the digital printing world, the skills required are significantly different. A digital output device has no ink and water, no printing plates and no drying system. In fact, there is relatively little the operator must do in terms of physical machine adjustment or maintenance without training from the supplier. Digital laser printing devices use electrophotography via a laser to charge an image onto a drum and then apply toner to the charged image with a final step of fusing the toner to the paper. Any adjustments to the image quality are done through operating software on the device. The typical skills required to operate a digital production printing device would be:

- Knowledge of the operating software
- Knowledge of inline finishing capabilities (inline saddle stitching, hole punching, etc.)
- Knowledge of application capabilities of the device (imposition, multiple-up, color adjustment)
- How to perform color calibration
- How to manage the job queue

These are skills that are output device specific. However, in the digital laser printing world, there are a host of related skills that support the operation of the device. These would include:

- Digital file preparation, digital image capture and electronic page layout
- Knowledge of Digital Front-End (DFE) systems. DFEs provide many pre-press functions such as color adjustment, color balancing, reprinting, imposition with gutter adjustment strategies, special stock integration, etc.
- Digital pre-flighting
- Knowledge of print drivers associated with the device
- Knowledge of key software-based document creation tools (InDesign, Publisher, Adobe tool suite)
- Workflow and queue management software between multiple devices
- Accounting software
- Font management and problem resolution

These changes in required skills are confirmed in the U.S. Government Bureau of Labor Statistics, 2010–2011 Edition. The study concluded that opportunities for employment in printing machine operation should be favorable. Retirements of printing machine operators and the need for workers trained on increasingly computerized printing equipment will create many job openings over the next decade. Small printing jobs increasingly will be run on sophisticated high-speed digital printing equipment. Those who complete post-secondary training programs in printing and who are proficient with computers will have the best employment opportunities.

#### Digital technology means expanded applications and more specific skills requirements

#### New technology

The combination of new software and digital laser printing has enabled production content that was previously not possible with offset printing. The operating principle of offset printing is to create a single master and produce many copies at very low cost. Offset printing is well suited for this type of longer run, fixed content application. However, digital printing provides the ability to change or customize the content on every single page without impacting output device productivity, a feature known as variable data printing.

#### **Expanded applications**

Variable data printing has opened a new growth area as it is relatively inexpensive to create a customized piece of printed material. A prime example can be found in photo books customized printed books that can be easily assembled from a group of digital photos. Through the combination of easy-to-use assembly software and high-speed digital printing, a photo book can be assembled in less than an hour and quickly produced with stunning quality on a digital production device. Books can be saddle-stitched inline or offline bound with a hard cover providing a professional finished product. Photo books can be produced for a wide range of applications from end-user consumer keepsakes to professional business publications to elementary school yearbooks and calendars. An application like photo books, which will typically have much shorter run lengths, cannot be produced cost effectively with traditional offset printing.

Another example of a new application for variable data printing using assembly software and digital printing can be found in the Direct Marketing arena. Direct marketing is transitioning to be more customized to the end user recipient. Industry research clearly demonstrates that personalized printed communication generates a 500 percent increased response rate over generic printed communications. Think about the impact of a personalized catalog from a merchandiser like L.L.Bean where the catalog you receive only contains items that align to your previous purchases or expressed interests. Other examples include incorporating the name of the person targeted in the communication and personal preferences. Other examples of personalized communications include:

- Customized student marketing for higher education
- Direct mail discount offers
- Customized direct mail
- Customized charity appeals
- Personalized product pieces
- Customized billing with embedded promotional offers

#### More specific skills

The skills required to build a customized set of variable data communication pieces as part of a specific campaign are unique. Graphic design must incorporate variable content, both text and photos, that change on every printed piece. Workers must also be able to match and marry variable data, typically found in databases and spreadsheets, with the graphic design. Software tools such as Adobe InDesign and XMPie are required to fulfill a personalized marketing campaign.

While hardware and software continue to advance, there is a shortage of skilled individuals who possess a working knowledge of the new "tools of the trade". For those schools that can transition their programs to incorporate the skills required for digital printing, their students will be on the ground floor of an industry that is in the process of dramatic change. But where do you start?

# The Xerox® School to Career Program can help schools face the future successfully

The Xerox® School to Career Program helps schools transition their CTE printing program to incorporate both digital printing output equipment as well as the digital file preparation component. This program can incorporate numerous elements as needed including:

- Digital document output tailored to many different product types
- Digital file preparation
- An on-site teacher's assistant to support lab and learning exercises for the students

These digital elements can be added to an existing program that includes offset printing or can be the basis of a new program. The program can also be implemented as part of a technical trade school program or delivered at an individual high school.

The Xerox® School to Career Program includes creative elements that can enhance the value of the program for students. Several school systems that have implemented this program have shared the digital production equipment for multiple purposes. The equipment is used as part of the delivery of the technical education program/curriculum in the school. However, when the equipment is not being used by students for training or lab exercises, it is used to help meet the reproduction needs of the school and/or the school system for classroom materials. This alternative use of the equipment investment not only offers a cost savings to the school system but also provides real-world job experiences that students will encounter when they transition into the workforce.

School systems have also used production equipment for revenue generation to cover the costs of the School to Career program. In some cases, the students have produced output for local non-profit organizations, restaurants or city governments. In other cases, students have used the equipment to support fundraisers such as school building-specific calendars with local business advertising. Another growing application is elementary school yearbooks, which generate significant revenue for the school system if production is completed in-house. Both the calendar and yearbook applications provide students with opportunities to be involved in the entire document life cycle process from design to assembly to final production.

There are many avenues that will allow the school system to recover the hardware and software costs of the program while providing the students with valuable work experience. A video case study of a program that combines education and work experience can be found with the school district of Philadelphia. To view the video, go to <a href="http://www.youtube.com/watch?v=OxcRVXQ2qFs">http://www.youtube.com/watch?v=OxcRVXQ2qFs</a>.

#### Accreditation/Certification is just as important as industry relevance

School systems involved with CTE programs are keenly aware of the importance of program accreditation or certification. Accreditation, which can occur at any time during the life of the program, provides an independent stamp of approval of the quality of the program and instruction. Accreditation by an industry recognized organization provides prospective employers a higher level of confidence that the student has a core set of skills required for the business.

A non-accredited program does not necessarily diminish the quality of what the students are being taught or the relevance of the content. However, without the independent program evaluation, the prospective employer could be more skeptical that the student possesses the desired skill set. In either case, a prospective employer is likely to ascertain the skill of the individual during the job interview process.

The leading national organization for accrediting CTE programs in Graphic Communications/ Printing at the secondary and post-secondary levels is PrintED (http://www.gaerf.org/PrintED. aspx). PrintED accreditation typically takes 12 months. During this period, a PrintED Evaluation Team Leader will work with the instructor on a series of steps including:

- Application completion to ensure the program meets minimum requirements
- On-site facility inspection
- Program recommendations
- Completion of standards binders which validate the current curriculum is aligned to the required competencies of the program. Binders also contain administrative material and general information about the program.
- Self-evaluation
- Accreditation

PrintED accredited programs consist of a minimum of core competencies drawn from a broad set of graphic communications skills. More details can be found at <a href="http://www.gaerf.org/PrintED/">http://www.gaerf.org/PrintED/</a> Competencies.aspx.

The school program is generally responsible to determine how students will be evaluated. There are independent assessments of various program elements available from organizations such as SkillsUSA. For example, the assessment for Digital File Preparation/Digital File Output will assess against the competencies in this document (<a href="http://www.workforcereadysystem.org/">http://www.workforcereadysystem.org/</a> media/blueprints/DigitalFilePrep.pdf) from the Skills USA website. PrintED and SkillsUSA have partnered on many assessments. More information on assessments can be found at http://www. workforcereadysystem.org/printed.shtml. PrintED-accredited institutions can also administer their own evaluation measuring the student's performance and issue a certificate indicating the student's achievement.

## Defining success in the changing world of print industry Career and Technical Education

The broadest measure of any successful program is graduating students who are hired in the industry and go on to successful careers. While much of this data is proprietary to individual schools, parameters that are likely to lead to a successful program include:

- A knowledgeable instructor with real world experience
- Experience with the curriculum
- On-site support person to work the equipment/software and assist students with exercises so the instructor can focus on classroom instruction
- Real world jobs in the shop as part of the curriculum
- Certification indicating the student has graduated from a PrintED accredited institution or used a curriculum that used PrintED's Digital Production Printing Competencies

In summary, the dramatic changes in the printing industry provide a wealth of new job opportunities for those with the right skills. As offset printing forced the obsolescence of letterpress printing technology, digital printing is becoming a new standard in the Printing Industry. CTE programs that adapt to the new paradigm will provide the training and skill sets for the students that will lead the digital printing industry.



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