

Printing on the Starship Enterprise: The Future of Graphic Communication Education in the USA

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Keywords: graphic communication, education, future

As the needs of the many outweigh the needs of the few, the graphic communication industry, and the educational institutions that supply it with an educated workforce, is experiencing a colossal paradigmatic shift. The needs of the industry have changed as graphic communication enterprises chaotically respond to an increasingly lessened demand for traditionally printed media. As a result, printing enterprises expand into multiple auxiliary services that include grand-format printing, web development, app-design, packaging, functional imaging, and 3D printing, to name just a few. The needs of the student also have changed. In a computer-immersed world, the generation of today (Generation Z) place little value in obtaining skills that are manual and/or analog, hence, printing organizations are finding unskilled labor and training them from within in order to keep their mechanical presses in operation. Consequently, the curricula of educational institutions have frantically responded by increasing offerings in cross-media technologies that are inclusive of interactive-web design, smart-phone application creation, 3D graphics and animation. Such action is essentially a reaction to meeting the demand of the new generation (Generation Z) for whom every member is fraught with the decision of choosing an educational institution that will provide the largest gamut of successful and growth-oriented career options. Will printing remain at the core of the American educational curriculum? Or will it simply fall to the wayside and be absorbed as medium in transition destined to become a minimalized track or concentration in a program based in computer media? As both the graphic communication industry and educational institutions brace for the change, inevitably, the end result will require everyone to look up into the sky and consider what role will it play on the Starship Enterprise.

1. Educational Enterprises: The Spaceship

The year is 2151, and Jonathan Archer, the Captain of the Starship Enterprise (NX-01) – a starship designed, built and funded by The Federation Headquarters located in San Francisco, California – is about to embark on an inaugural launch and mission. He instructs the helmsman to proceed out of the Orbital Drydock Facility (en.memory-alpha.org) with aft thrusters and then suggests one-quarter impulse power. The helmsman obliges and the ship proceeds towards designated coordinates. Once the path is considered clear, the ship engages into Warp Speed eager to reach the final destination in a precisely calculated period of time.

Reliant on a crew of 85, the Starship Enterprise NX-01 is a self-sufficient, closed system of recyclable natural (and unnatural) elements designed to sustain the life-energy of humans aboard the vessel, as well as, maintain the resources required to fuel the engines (Robinson & Riley, 2019). Water for the ship and crew is manufactured through natural processes, the fuel is manifested through the use of Dilithium crystals, and air is manufactured through a process of water-based electrolysis (en.memory-alpha.org). A self-sustained system has no room for excess waste or unlimited inventory. The Starship Enterprise NX-01 is truly a self-contained and sustainable living entity designed for interspatial travel enduring extremely long extended periods of time without the luxury of pulling into port and loading up on supplies and sundries.

Of course, the scenario above is fictitious. The Starship Enterprise NX-01 (or any of the others that have been introduced in Gene Roddenberry's legendary Star Trek series) has yet to be realized. Much of the science associated with the series has been the quintessential "grail" for seasoned physicists and engineers alike. Michio Kaku (2011), a theoretical physicist from the City College of New York, has researched the advancements in the areas of time travel, Warp Speed, dematerialization and transportation, as well as, protective shield and communication technology. Dr. Kaku's prognostications are – although the physics is scientifically grounded – it will be hundreds of years before a real self-sustaining interstellar space travel vessel will be launching expeditions that will hop between multiple galaxies contained in the Universe as we know it.

However, with such engaging conversation – and imagination – looking into the future of the printing and graphic communication industry as it applies to the confines of space travel is both thought provoking and pro-active. What will be the role of the printing or – as we refer – graphic communication in the future? Will such services be required in 300 or 200 or, even, 100 years? What will be the expectations of the graphic communication service provider of the future? Will it be to mass-produce millions of static fliers for distributive marketing or, perhaps, to manufacture customized products that potentially sustain life? Will the graphic

communication services provider of the future even use traditional printing technologies or, will he or she become a specialty prototyping service bureau responsible for manufacturing parts using 3D printing technologies? Also, consider the possibility that a service provider of the future could evolve to become a printed electronic hub capable of designing and manufacturing printed batteries for printed electroluminescent signs complete with printed and embedded RFID tags programmed to synch with GPS tracking devices or NFS-compatible communication technology. Lastly, the graphic communication services provider could exist as a design firm responsible for creating and manufacturing interactive displays that integrate augmented reality with 3D graphics that cast an entertaining message across networked digital signage.

No other industry in the history of humankind has experienced the magnitude of change from such a colossal paradigmatic shift than that of the Graphic Communication industry. The past 30 years have generated a chaotic effect that has wielded devastating change in the printing industry. A once analog-based, heavy-ironed, mechanical existence known to the traditional printer, has easily been bowled over by the abrupt and strong onshore winds of digital and computer assisted design, website development, smartphone application development, printed electronics, and the most recent (yet mature) advent of 3D printing. And, like squirrels who have weathered out some severe economic climates and have watched their supply of food – in the form of publishing (i.e. newspapers, magazines, books, and manuals) – fall to the wayside, printers of yesteryear have switched their foci to charging down the Marketing Services Provider road only to find even more heavy investments into un-vetted technologies in need of a specialty trained sales force exhausted by a technological climate fraught with uncertainty. So then how, the question is begged, do we steer this quintessential ship? What is the future of the industry and, how do we best prepare those entering future workforces to assist the graphic communication enterprises in understanding, implementing, and promoting these chaotic un-vetted technologies full of uncertainties and unknown outcomes? The dilemma is forthright and daunting. Is print in its final frontier? For it would seem, most fittingly, that

the mission of the Graphic Communication Educational Enterprise is...to explore strange new worlds (in forms of innovative and challenging technologies); to seek out new civilizations (in the form of new markets that develop relationships and create innovative, applicable, and useful products); and, to boldly go where no other educational enterprise (the discipline of Graphic Communication) has gone before.

2. Charting the Course

In his column at Whattheythink.com, a daily newsfeed service and website targeted towards C-level executives from graphic communication organization and equipment manufacturers in the United States, in an article addressing the future of education, Professor Frank Romano (2011) wrote:

The printing industry will still need about 20,000 to 30,000 new employees every year to replace retirees. But the skillsets of these new employees will be totally different from their predecessors. The new skillsets will be IT-based, emphasizing digital printing and new workflows, especially cross-media workflows. The skillsets of the old printing industry are now shrink-wrapped – they are computer programs. Like estimating and planning. The first rule for all college degree programs is not to call the program printing. The word printing to a highschooler ranks somewhere above fast food and just below farming. (p.1).

Romano's observations are blunt, yet provoking. Because, in the United States, there have been many high school, community college (two-year degree programs), and university (four-year degree programs) printing-based programs terminated or absorbed by other programs. There are many reasons for these programs' demise; 1) faculty retirement and resource limitations; 2) reduction in funding for equipment acquisition and upgrades; 3) termination by administration due to heightened compliance to more strict environmental protocols; 4) reduction in enrollment due to lack of potential student interest; and, 5) deteriorating administrative interest in a discipline that is thought to be declining in growth and waning in economic prosperity.

Printing companies in the United States have also witnessed a significant reduction in the workforce over the past five years and will continue to see a reduction by 4.4% into the year 2020, according to the United States Bureau of Labor Statistics (<http://data.bls.gov/oep/noeted>). Such consequential changes will force educational institutions to consider harsh realities that will inevitably lead to the redesign of curricula on a monumental scale.

3. Changes in Graphic Communication Educational Programs Within North America

Rochester Institute of Technology, Rochester, New York, USA

A premier research university located in Rochester, New York, RIT resides amidst the rich technological spires of Xerox, Eastman Kodak, and Bausch & Lomb. RIT's School of Media Sciences (College of Imaging Arts and Science), a staple in the United State's graphic communication community has begun to phase out the heavy dependency towards traditional printing technology and has expanded into the realms of cross-media technology and interactive media. RIT's Bachelor of Science degree in Media Arts and Technology "develops skills across areas such as traditional publishing, cross-media workflow, digital asset management, and database publishing" (RIT, 2013). The internationally renowned program has found that the competitive environment facing both private and public higher education learning institutions have forced administrators to consider redesigning and revamping curricula that is both alluring and practical for students and industry alike. Key administrators within the program report that the technical expertise already resident within the College of Imaging Arts and Sciences provided an excellent transition to evolve a program that trains students to effectively manage content to reach global audiences that range from one person to millions – through print, Web, mobile, and social media. Hence the migration.

Similarly, RIT will also be considering advancing into other forms of graphic media such as animation and gaming development. Print media will remain part of the curriculum, but not as the primary core that it once dominated. Print media will carve out a small percentage of space in the new curriculum laden with multiple-media that it is heavy in information technology (IT) and is data-driven (RIT, 2013). As RIT – considered to be the quintessential research school for printing technology in the United States and, a dominant and influential Western leader – transforms their curriculum, then so

shall they directly influence the graphic communication educational communities that follow their lead, as well as, the industry that has benefited from their research and guidance for so many prosperous years.

University of Wisconsin-Stout, Menomonie, Wisconsin, USA

Similar to RIT, UWS has also most recently changed their degree program name. Formerly, Graphic Arts, the revamped curriculum for their Bachelors degree in Cross-Media Graphics Management focuses on generating an educated workforce that can manage cross-media campaigns that include printed direct mail, email blasts, response web-microsites, social media integration, utilizing mobile technology to access related online content. Members of the faculty report, "Our program is an amalgamation of graphics media that encompasses workflows, business issues and production efficiency coupled with design, image reproduction processes and technology" (UWS, 2013). The inclusion of Big Data requires that the workforce of the future have a multifaceted understanding of how data integrated into all streams of media will be the norm for communicating messages and an information hungry society. Although printing technology is a solid component of their program, there is an equal emphasis placed on the data-driven aspects of digital media and, more importantly, the metrics required to determine the overall effectiveness of all media.

The College of DuPage, Glen Ellyn, Illinois, USA

The Graphic Arts Technology Program was officially terminated in Spring 2013. The President of The College of DuPage, under the council of administrative personnel and without prior notice, decided to terminate the program quickly and swiftly without explanation. The Graphic Arts Program was a very successful hands-on industry supported training program for the Chicago Metro printing industry. According to Dean Roeing, a former instructor at the College of DuPage, the reasoning for the closure was based on the administration's lack of interest in the discipline. "The administration felt," reports Roeing, "that the program was not a viable educational pathway according to state and national statistics" (Sevastano, 2013). While there is still a small cohort of students who are progressing to complete their degree requirements, the program will be phased out completely in late 2014.

Pennsylvania College of Technology (PennTech), Williamsport, Pennsylvania, USA

The Graphic Technology program (part of the Pennsylvania State University in Williamsport, Pennsylvania) dismantled their program in 2011 due to poor enrollment. Penn Tech, much like College of DuPage, was an excellent hands-on program that generated skilled and knowledgeable operators destined to enter a graphic communication workforce without delay. The reasoning for the closure of this program was now due to administrative arrogance or unfamiliarity with the very industry that it represented, but simply because the targeted market of young Gen Y students lacked interest in entering such a field. Frank Romano (2011) laments, "The GT curriculum covered the basic ground of most printing programs with newer courses for digital media publishing. But high school kids do not want to be printers and our industry has done a terrible job in changing their perception of the industry" (2011). This remains to be a core issue of discussion at the heart of every graphic communication educational program.

NorQuest College, Edmonton, Alberta, Canada

The Centre for Excellence in Print Media, a grant funded and successful two-year training program that served the Alberta graphic communication industry, closed its doors in 2013. After a massive administrative change, the value of the program was assessed and then determined to be of no relevance to an industry in decline (Norquest, 2013). This program provided hands-on instructions for operators of presses, prepress workflow, and bindery technology. Their program was well received by the industry but when the focus of the university moved towards healthcare, the program became irrelevant to the university mission and the space – highly coveted.

Because of the demise of such strong programs, a premeditated angst has been cast across the country, one that requires directors of similar programs to reflect from within and prepare strategic plans that circumvent the susceptibility of administrative closure, a disengaged industry, and a disinterested generational cohort of future and prospective students. Of course, The California Polytechnic State University, in San Luis Obispo, California is not exempt when it comes to dealing with these same issues, however, there are some differences worth consideration.

4. The California Polytechnic State University – Case Study

The California Polytechnic State University, San Luis Obispo, California, USA

The California Polytechnic State University is one of 23 campuses that complete the California State University System (CSU). As a comprehensive polytechnic university, Cal Poly differentiates itself from academic institutions through its highly acclaimed Learn by Doing mantra – a pedagogically based philosophy that builds the breadth and depth of theory through hands-on applications. The Graphic Communication program at Cal Poly (GrC) enrolls around 350 students at any given time and, approximately 50–60 minors. The program, originally founded as the School for Country Printers, was focused primarily in the areas of printing technology and the business and operations management of such technology. At the advent of the Macintosh, Cal Poly moved into the world of digital design, desktop publishing, digital imaging, and workflows. In the 90's and early at the beginning of 2000 the curriculum expanded into high-end digital design for publishing and, eventually, websites. As the industry began to react to all of the change, Cal Poly started a concentration in the area of Packaging with an emphasis in design. In around 2005, the program dropped a concentration that was focused in the area of prepress and imaging workflow and started a new concentration in website and digital media that explores content management and variable data output. Lastly, slated to begin in Fall 2014, an online certificate course and Master of Science degree will be offered in the area of Printed Electronics and Functional Imaging.

Cal Poly is an interesting case, in that students that apply to Cal Poly must choose a major prior to entering. Many high school students are not often quite committed to their major when they first begin their college career, especially when they enter Graphic Communication. Many assume that it is more fine art or exclusively web. Most all of the students that enter the program are familiar with traditional printing technologies. However, after completing their degree requirements, they are quite knowledgeable in the field of both traditional and digital printing methods, workflows, operations management, and business foundations. The core curriculum is supplemented through the choice of their concentration option, that being: 1) Digital Reproduction Technology; 2) Packaging for Graphics; 3) Web and Digital Media; and, 4) Graphic Communication Management.

Unlike many graphic communication programs at other institutions, Cal Poly's GrC Program is fortunate in that it does not require external recruitment efforts. In 2013, Cal Poly admission office reported that over 48,501 students applied to Cal Poly for 4859 seats (Cal Poly, 2013). GrC received 259 applications plus 50 additional applications from transfer students and admitted 91 total, which is up 12% from the previous year (Cal Poly, 2013). Given the climate associated with the change in societal needs towards print publishing, the question has been pondered quite often, "if the enrollment was down, would the program be as strong?" The students who graduate are randomly interviewed before they exit and most assuredly, when asked what more they would want from the program, their answers are inevitably "more web, and less print." They do, however, admit that they leave with a heightened appreciation and advanced knowledge base in the areas of printing technologies and, consequently, find great value in that as it provides a definite differentiating quality when entering a competitive job market.

In light the paradigmatic shift experienced by both graphic communication industry and in society's role of print (most specifically with the advent of electronic publishing in the area of newspapers, magazines, and books), faculty and administration at Cal Poly have remained supportive and optimistic of print's role in U.S. society. However, a strategic initiative is currently underway to better understand the needs of the industry, and any correlations that can be observed with regards to the needs of the student coupled with the needs of society and the end user.

5. The Needs of Many

In a scene from the movie, *Star Trek: Wrath of Khan* (1982), Captain Spock, the ship's science officer, consciously makes a decision to enter the chamber that houses the Dilithium crystal to repair it. In doing so, he is exposed to lethal doses of radiation. When Admiral Kirk, his friend and confidant, rushes to be by his side (separated by glass), Spock recites, "The needs of the many is outweighed by the needs of the few" (Bennett, Sowards, & Peeples, 1982). It is with best intentions, therefore, that the context of this scene be cast in light of our educational programs as they relate to or affect the varying needs of the vast entities that that come in contact with them each and every day.

The Needs of Students

The newest generation to officially enter the halls of the academy in 2015 are known as Gen Z. This generational cohort is categorized through birth years ranging between 1994 and 2009. They, of course, follow the infamous Gen Y generation (also known as Millennials) who has categorized birth dates between the years 1977 and 1994 (Gravett & Throckmorton, 2007). It is certain that technology will remain a staple in their lives as it advances into even deeper modes of creativity, community and collaboration. What will change significantly over the next ten years, however, will be in the education sector. Teachers will morph from didactic lecturers to collaborative mentors who will provide experiences for more pragmatic and engaged learning (Macro, 2012). Therefore, the needs of the students (who comprise this particular generation) are dependent upon the Internet, communicative technologies, and personal mentorship to provide them with instruction in learning to understand how to learn. According to a study conducted by Deloitte (2008),

To be most effective with young workers, employers should be aware of their strong appetites for information and their willingness to use all available channels to gain more information. Their two priorities are: give us lots of information through as many vehicles as possible, and make it interactive and fun. They are more likely than others to take advantage of new channels, such as blogs, electronic message boards, and podcasts. This age group is interested in entertaining, teambuilding activities, especially in the non-industrialized countries. (p.6)

The more prepared we are to welcome this particular generational cohort, the better we will be at designing, creating, and delivering content to derivatives of future technologically-wired generations. To do this, however, we must understand what demographic trends are predicted for our individual communities. In the State of California, for example, changing demographics predict growth in terms of the state's working age population (25-64) is expected to decline. According to the Sol Price School of Public Policy (Pitkin & Meyers, 2012), the period of 1990-2010 experienced a growth of upwards of 4.2 million; whereas, the number is expected to hit 3.3 million during the period of 2010-2030. This means that there will be a significant deficit in the workforce and a skilled workforce needed to maintain the status quo will

be in great demand. This will have great forbearance on curriculum design, enrollment needs, physical classroom requirements, technological systems use, and require significant interaction and partnership with localized industry.

New studies have recently emerged on the topic of generational integration with regards to Gen Z. Amanda Riply (2013) has generated an ethnographic report that analyzes the practices of secondary education programs in Finland, Poland, and Korea. The impetus to the report was to understand how other countries – not traditionally identified on class rankings and review charts in the educational sector – could be generating extremely well-prepared, diverse, and high-achieving, high scoring graduates. What she found was that these three countries – as with many others – place great priority in providing their youth with a rigorous, high quality, well-rounded education that prepares students to enter a world that is fast, chaotic, changing and complicated. They do this by providing significant funding and concentrated guidance in order to assure positive progression. They let their students fail, and learn from these failures. They hire and maintain the best-educated professionals from the world and they compensate them accordingly. They continually attempt to generate a cultural aura that places significant status on an intellectualized community of inhabitants that work for the common good. Riply (2013) writes, “All children must learn rigorous higher-order thinking to thrive in the modern world. The only way to do that is by creating serious intellectual culture in schools, one that kids can sense is real and true” (p.199). The future generation of students must understand – first-and-foremost – why education will remain a constant in their lives. Then, with greater importance, they can begin to understand how the discipline of Graphic Communication will provide them with necessary skill sets that will enhance their integrative expectancy within the workforce of the future.

Thomas Koulopoulos and Dan Dresden (2014) provide powerful insight for businesses struggling to understand the workforce of the future and how to successfully recruit, hire, and integrate the incoming Gen Z cohort. According to the Koulopoulos and Dresden (2014), “with work-life expectancy increasing, by 2020 will easily have five generations working shoulder to shoulder” (p. xix). Having an intimate understanding of Gen Z is imperative for educators facing strategic planning and enrollment planning initiatives taking place within their very own institutions looking to embrace technological and peda-

gogical shifts in content delivery and distribution. There are six forces associated with Gen Z that will shape the future of business, one of them being education. “Education is not only the process through which we gain knowledge about the world,” write Koulopoulos & Dresden (2014), “but also the process through which we define our own identity” (p. 133). It is believed that Gen Z will aggressively challenge the norms associated with traditional educational pedagogy and how material/knowledge is delivered. The use of MOOCs, online, peer-to-peer, flipped classroom, gaming and interaction will render a great behavioral shift in learning and teaching and models of educational institutions of the future (2014). Moreover, blended learning opportunities involving social media technology will only enhance the Gen Z classroom (SCUP Academy Council, 2014).

Therefore, in evaluating the preparedness of the graphic communication discipline, technological advancements continue to break paradigms to the norms attributed to truths in our society. It is evident that print, as we once knew and have known it, will inevitably change. As a manufacturing vehicle for placing inks, toners, and substance onto substrates for the purpose of conveying a message or image, it will always remain as staple for producing millions of products to be consumed by humankind. It is up to Graphic Communication Educational enterprises, however, to remain diligent yet strategic, accommodating yet foundational and, traditional yet futuristic – in order to gain favor and adequately satisfy the needs of future generations. We as educational institutions must be obligatory but in the best interests of all.

The Needs of the Graphic Communication Enterprises

When attending the latest DRUPA (the largest printing/paper show in the world, held in Dusseldorf, Germany every four years) and, GraphExpo 2014 (an annual printing show that is held in Chicago, Illinois), a theme is always established. During Print2013 and GraphExpo2014 (USA), inkjet technology, packaging, and 3D printing capitalized the media frenzy. Feeling slightly optimistic of the future, after a devastating six years of recession, printing enterprises came out to attend the show and began to talk again with equipment manufacturers about future capital equipment investments. However, there was absolutely zero representation from the sheetfed and webfed printing technology equipment manufacturers. In fact, Heidelberg Druckmaschinen or MAN Roland opted to not attend the show nor have a

presence at either of the American shows. Their reasoning was based on observations and data that suggest that the United States is not to be a growth market that conducive to enhanced sales and revenue objectives in equipment placement and installation. So, what message does that convey to the public, to the industry, to educational institutes, and, most importantly, students enrolled in graphic communication programs? The message is that traditional printing technologies associated with the publishing sector are in declining market and are less deserving of emphasis in a highly competitive digitally focused environment.

Graphic Communication Enterprises scramble to integrate the "latest and greatest" technologies that can drive ancillary revenue. Wide format inkjet printing, mailing and fulfillment, sign making, website development, smartphone application development, creative design, specialty products printing, screen printing, e-book and e-Zine creation, digital packaging, and even information technology and marketing solutions services. The needs of the Graphic Communication Enterprise are many. However, what is needed is a new generational workforce that can leverage the current technology as they simultaneously create new and innovative service offerings. That is where strategically focused and future-oriented educational institutions provide the most value.

The Needs of the Educational Institutions

The toll of the past economic recession left the Educational sector in the United States in a significantly weakened state. With a dependency on both federal and state subsidies, operating and expense budgets for public educational institutions were drastically cut. The result, of which, lead to program shutdowns, layoffs, furloughs, and reduction in equipment acquisitions. Consequently, institutions were forced to significantly raise tuition just to retain a minimal cohort of faculty, staff and adjunct faculty to simply maintain the status quo. As you read, briefly above, some programs were terminated and others absorbed. Universities and educational institutions are now engaging in space utilization assessments and performing throughput analysis to measure student graduation rates. A program, such as the one at Cal Poly, has over 33,000 square feet of laboratory space. With such a large consumption of real estate, it is imperative that it be constantly monitored and justified. What education institutions need, especially from Graphic Communication programs, is the ability for such programs to integrate, collaborate, and assimilate with other shifting disciplines encroaching like

research, training, and instructional space. For instance, packaging and industrial technology programs can easily share lab space and create cross-curricular programming for packaging-minded (both technical and creative) students. Similarly, traditional Art & Design programs can partner with graphic communication to integrate print media into the design curriculum. Traditional Journalism programs integrate newspapers as one form of media in the distribution and dissemination of news. Perhaps the development of a joint program involving journalism, business marketing and graphic communication could be created to explore the ever-evolving world of multi-channel marketing. Educational institutions need to understand the role of print for the future and how it best integrates strategically with all other disciplines. It is no longer a sole discipline. It is now multi-faceted and complex with an over abundance of uncertainty steeped in a long history of familiarity and comfort.

To progress in this discipline of the future, one will require aptitude and proven application in the areas of critical thinking and planning as it relates to the skills and tools associated with the graphic communication field and not necessarily the major. Graphic Communication is in essence an amalgamation of disciplines that merge technology, science, and liberal arts into by-product enhancement. According to an online survey among potential employers (not necessarily graphic-communication related) conducted by the Association of American Colleges and Universities, Hart Research Associates (2013) concluded that nearly all employers surveyed (93%) agree, "a candidates demonstrated capacity to think critically, communicate clearly, and solve complex problems is more important than their undergraduate major" (Hart, 2013). Similarly, The Society for College and University Planning writes, "Parents, the community, businesses, and the federal government need to have graduates who can think critically, write, speak, work in teams, and have an understanding of the global nature of today's society and workforce. Simultaneously, the business model for higher education has changed dramatically. Tuition-driven models are no longer feasible and public funding has declined for the last decade. To be relevant and innovative, institutions and their leaders must focus more deeply on the organizational structure and the processes that maximize effectiveness" (SCUP Academy Council, 2014). Therefore, change is eminent, efficiency is expected, and accountability mandated. As purveyors of the graphic communication workforce of the future, we must now begin to plan.

6. Print: The Final Frontier

In his book, *Chasing the Rabbit: How Market Leaders Outdistance the Competition and How Great Companies Can Catch up and Win*, Steven Spear (2009) wrote:

The capacity to be faster and stronger in the design, operation, and improvement of complex systems depends on seeing where knowledge is needed, generating knowledge, and sharing and intermingling that knowledge so that the expertise of the individual is a function of his or her experience combined with the experience of many others who have done related work (p.227)

The question becomes, who drives the direction for knowledge acquisition? Is it the graphic communication enterprise, or is it the graphic communication educational institution? Perhaps it is both. There has been a separation between the institution and the enterprise for some time now. This is primarily due to the fact the enterprise (printing businesses) was in need of vocationally educated workers with mechanical and analog skillsets in an industry yet to rediscover itself. Conversely, academic programs – destined to reinvent trendy curricula alluring to younger generations all in the guise of sustaining and/or enhancing enrollment and reducing floor space and equipment costs – abandoned vocational models and jumped headfirst into a digital plane complete with Apple, Adobe, and WiFi. The time has come to rejoin the two and begin looking into the future and sketching out the plans for preparing a workforce to man the graphic communication services sector on the Starship Enterprise, because this is only the beginning of a new, exciting, and adventurous frontier. Finality is only for the unprepared.

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