

The Silent Transformation:

Evolution and Impact of Digital Communication Skills Development in Post-Secondary Education

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Introduction

This paper explores the evolution of digital communication skills development in post-secondary educational institutions around the world. It considers how expectations of and opportunities for effective digital communicators extend well beyond the domain of graphic and visual artists, videographers, and web designers. Today, competencies that have traditionally been expected from art and design professionals are now expected from professionals working in such disciplines as journalism, education, and medicine. The emergence of new post-secondary fields of study such as informatics, medical imaging, instructional design, and educational technology, featuring digital proficiencies as core components of discipline-specific epistemology, further extends the notion of what it means to be a proficient digital communicator.

The Evolution of Literacy

Today's focus on building capacity for effectively communicating ideas and information extends beyond the traditional notion of literacy. Historically, literacy was defined as the ability to read and write. In the current era, a literate individual is one who has developed competencies that leverage reading and writing skills toward the goal of effective communication. In today's world, a proficient communicator needs to be computer literate, visually literate, information literate, media literate, and digitally literate.

To be computer literate, one must know how to use a word-processing program, a spreadsheet program, a slide-presentation program, and how to perform the appropriate maintenance and security to ensure that his or her computer works properly. Visually literate individuals understand the nature of images and multimedia and comprehend how visual representations are created, produced manipulated, and shared. Being information literate entails knowing how to find, analyze, and share accurate information coming from valid and authoritative sources. A media literate person has a deep understanding of the means by which communications are created and shared. This includes mass media, such as newspapers and online news sources; television; magazines; websites; and "long tail" interactive social media, including RSS, blogs, wikis, and micro-blogging applications for Twitter.

The boundaries of digital literacy continues to morph and change as the digital world around us morphs and changes. The 2010 United States Department of Education's National Technology Plan recently observed that our education system relies on core sets of standards-based concepts and competencies to form the basis of what all students should know and should be able to do. Whether the domain is English language arts, mathematics, sciences, social studies, history, art, or music, states should continue to consider the integration of 21st-century competencies and expertise, such as critical thinking, complex problem solving, collaboration, multimedia communication, and technological competencies demonstrated by professionals in various disciplines. (<http://www.ed.gov/sites/default/files/netp2010.pdf>)

To help with the task of bounding expectations, some professional associations are providing guidelines to members that situate definitions and standards for practice under the purview of the association issuing the guidelines. For example, the International Society of Technology in Education's (ISTE) National Educational Technology Standards for Students (*NETS-S*) gives K-12 teachers a framework for guiding skill development in elementary and secondary schools. *NETS-S* suggests that the digitally literate student knows how to use technologies in socially acceptable ways and has a healthy understanding concerning privacy and safety issues. The digitally literate student can also demonstrate creativity and innovation, create new knowledge collaboratively in a face-to-face environment and at a distance, think critically, and use technology effectively and productively in order to share the results of such efforts.

The Association for Educational Communications and Technology (AECT) is another example of a professional association focused on representing the interests of the professoriate of educational technology and instructional design faculty and school-based practitioners of instructional and education technology, instructional design, and educational media services. AECT provides a definition of the field of educational technology to scholars and practitioners working in the fields of educational and instructional technology, ICT, instructional design, and related fields. AECT takes the responsibility of articulating the essential skills needed to be successful to effectively integrate technology into meaningful educational experiences, and have published their take on the importance of standards according to a framework built upon design, development, utilization, management, and evaluation skills <http://www.aect.org/standards/initstand.html>. <http://www.aect.org/standards/advstand.html>. AECT is one of several associations that actively works with the U.S. National Council for Accreditation for Teacher Education (NCATE), who provide oversight for those engaged in the preparation of teachers. www.aect.org/affiliates/national/Standards.pdf

Important government-sponsored initiatives aimed at enhancing the digital skills of students and educators provide additional guidance, and are gaining wide acceptance and prestige all over the world. For example, the European Commission launched the *European Year of Creativity and Innovation 2009* (EYCI 2009) to stimulate education research and promote policy debate on issues geared toward raising the awareness of creativity and innovation for personal, social, and economic development. Part of the outreach of EYCI 2009, among numerous related efforts across Europe, was a survey of 10,000 teachers from the 27 member states of the European Union. A report on this survey prepared by the Institute for Prospective Technological Studies (IPTS), which is part of the European Commission Joint Research Centre, showed that an "overwhelming majority" of teachers see creativity as being relevant in all subjects, not just for intrinsically creative subjects such as in the arts. Furthermore, in a policy brief prepared by IPTS, "digital literacy consists of the ability to access digital media and ICT, to understand and critically evaluate different aspects of digital media and media contents and to communicate effectively in a variety of contexts." Part of the IPTS recommendations included that courses in vocational and higher education pay closer attention to developing advanced digital competencies that support the creation of interdisciplinary learning paths (Kirsti, A-M., Punie, Y. and Redecker, C, 2008). Additionally, a "high proportion" of teachers support the further development and training of information and communication technology (ICT) skills among themselves, as part of their professional development and/or postsecondary teacher education (Cachia, R., Ferrari, A., Kearney, C., Punie, Y., Van Den Berghe, W. and Wastiau, P, 2009 p. 7).

Australia has embarked upon extensive national digital literacy initiatives, investing heavily in digital literacy programs supported by strong strategic policy support. A 2009 national policy paper entitled Australia's Digital Economy: Future Directions http://www.media-awareness.ca/english/corporate/media_kit/digital_literacy_paper_pdf/digitalliteracypaper_annexb.pdf noted that key areas of focus for government, industry and the community in order to maximize the benefits of the digital economy for all Australians are:

- for Government to lay the foundations Australia's digital infrastructure, facilitate innovation, and set conducive regulatory frameworks.
- for industry, to demonstrate digital confidence and build digital skills, adopt smart technology, and develop sustainable online content models.
- for the community, to enjoy digital confidence and digital media literacy skills, experience inclusive digital participation, and benefit through online engagement.

Australia has also invested significantly in the necessary infrastructure and resources to foster a digitally literate population. Most notable is the \$2 billion commitment over the next five years to what's being called the Digital Education Revolution. Australia's Future Directions report notes, "one marker of success in maximizing our participation in the digital economy will come when distinctions are no longer made between digital and non-digital skills."

Digital Britain represents another government-sponsored initiative that is highly supportive of developing and adopting increased and more sophisticated digital literacy skills throughout its educational system. A Digital Britain Report, presented to Parliament in June 2009, stated that the UK government was responding to the needs of employers by supporting the development of "a national curriculum that offers seamless opportunities in digital competencies from entry-level school age through to Further Education (FE) and Higher Education (HE) to equip the future workforce with relevant digital skills to succeed." (Department for Culture, Media and Sport and Department for Business, Innovation and Skills, p. 173).

The Evolving 21st Century Digital Communication Skills Development Ecosystem

During the Spring of 2005, Adobe Systems Incorporated sponsored a summit designed to explore the dimensions of "21st Century Literacy." Facilitated by the New Media Consortium, this international assembly of authors, researchers, policy makers, educators and artists debated and discussed the evolving expectations for literacy in a world shaped by the emerging new media of the day. The definition that emerged at the conclusion of their discussions disclosed that a 21st century literate person has a "set of abilities and skills where aural, visual, and digital literacy overlap. These include the ability to understand the power of image and sounds, to recognize and use that power, to manipulate and transform digital media, to distribute them pervasively, and to easily adapt them to new forms" (New Media Consortium, p. 2).

While this definition continues to be relevant for many institutions, today's notion of 21st century digital skills has pushed and pulled this definition to include a widening range of capabilities. In contemporary post-secondary education settings, today's 21st century digital skills appear across curricula in two broad categories:

- **Digital Communication Skills:** Effective digital communicators need to be able to visually share their insights and ideas in cross-curricular activities that may feature any one or all of the following practices:
 - Digital storytelling
 - Documentary production
 - Design, creation, publication, and distribution of content assets, including presentations, video and Flash movies for use in cross-curricular academic settings
 - Humanities, arts, science, and technology collaboratories
 - ePortfolio development
- **Advanced Digital Communication Skills:** Students, faculty, and staff need to be capable of conceptualizing, designing, and producing rich digital assets and experiences, including:
 - Representations of the results of complex statistical analyses in visually compelling displays
 - Simulations of real-world decision-making situations that facilitate risk-free rehearsal
 - Multiple visual perspectives of complex scientific, sociological, and geographical relationships
 - Production and distribution of scientifically accurate documentation reports and publications, including electronic thesis and dissertations
 - Mobile content and applications

Software Applications and Digital Communication Skills Across the Current Post-Secondary Landscape

The evolution of these two sets of skills provide a framework for examining the motivators, enablers, and obstacles between members of the campus community and the skills each segment needs to establish a strong foothold in today's increasingly digital economy. While the digital skills required for successfully participating in school, business, and community activities will vary by task, so will motivators for developing digital skills vary when viewed across curricula. The creative expression needs driving a humanist to illustrate a story with photographs and video differ materially from the needs driving a medical researcher to provide the representational precision needed for making a diagnosis from images distributed over the Internet.

New digital communicators, coming from the disciplines, are engaging in multi-mediated conversations with far lower barriers to participation than those typically encountered by digital communicators in even the recent past. The ease with which non-technical contributors can produce and use simple photos, web video, movies, and webcasts is attracting a steady stream of new participants with little to no previous experience using digital media in teaching, learning, and research settings. They are discovering that they can be effective digital communicators without the need to develop programming or scripting skills. In fact, many are discovering that some of the free and open source Web 2.0 resources provide just the right tools for exploring the many alternatives for creating a spontaneous digital experience for learning. However, these new digital communicators also quickly discover that challenges emerge when casually produced digital assets created

for use in one setting are pushed to interoperate in another. Interviews conducted in the summer of 2010 with digital communicators from a variety of academic settings indicated that while Web 2.0 freeware tools are good enough for getting started, the need for reliably maintained, enterprise-ready software eventually leads to choosing industry-leading commercial software such as the Adobe® Creative Suite® 5. More advanced digital professionals, who have long needed to know enough about professional media and design techniques to produce high quality assets on their own, already acknowledge a preference for industry-leading commercial software that is licensed, supported, and maintained at the enterprise level at their institutions. Many of these technically astute academic practitioners have seen their disciplines transformed through the adoption of sophisticated professional tools such as Adobe Photoshop®, Flash®, Acrobat®, and Dreamweaver®. They have learned how to leverage the features and functions of the software in support of new epistemological directions that the professional level software tools enable.

Current and incoming students are self-taught when it comes to digital communication skills development. They have learned how to use the fundamental tool sets for manipulating and displaying images, and for creating and displaying relatively simple audio, video, and animated productions. They depend on trial and error, with tips from friends and with online resources ranging from courses to communities. Students enrolled in programs of study outside of the visual arts are not expected to be adept at using the more full-featured and advanced software applications that would allow them to create the representations, simulations, and visual perspectives noted under the aforementioned list of advanced digital communication skills. Nevertheless, students themselves are increasingly aware that digital communication skills proficiencies set them apart from other students. Research from the practice of higher education reveals that today's students are expected to possess 21st century digital skills by the time they graduate. The EDUCAUSE Center for Applied Research (ECAR) Study of Undergraduate Students and Information Technology, 2010, reported that 67.4% of the 36,950 students responding to the ECAR study's call for participation use graphics and rich-media software, such as Adobe Photoshop and Flash, in their academic programs of study (Smith, S.D. and Caruso, J.B., 2010, p. 57). More than one third (34.9%) of these students identified themselves as very skilled or expert in the use of such software (p. 69).

Increasingly faculty members outside visual arts disciplines possess self-taught digital communications skills. They are passionate about the benefits of digital communication and presentation activities. They actively utilize open source and free software to create adequate, but not highly sophisticated, digitized educational resources across post-secondary disciplines. Many do not see themselves as advanced technology users. Their focus is more on their discipline, and they fear that attempts at acquiring advanced digital communication skills might interfere with their focus on their discipline in which they are expected to be expert. These digital communicators, prefer technology use that responds to the needs of the discipline and not the other way around.

The Newly Emerging Post-Secondary Landscape Relative to Software Applications and Digital Communication Skills

As the demand for students, faculty and staff with advanced digital skills grows, there is a clear shift in thinking about the importance of digital communication skills acquisition, and the need to help people acquire those skills in practice. For example, the New Media Consortium's Horizon Report 2010 Edition lists visual data analysis as a technology to watch. Visual data analysis is "a way of discovering and understanding patterns in large data sets via visual interpretation." Visual data analysis software applications are capable of interpreting and displaying data for the scientific analysis of complex processes. "Visual data analysis is an emerging field, a blend of statistics, data mining, and visualization, that promises to make it possible for anyone to sift through, display, and understand complex concepts and relationships" (p. 7). In similar fashion, a study conducted by the Economist Intelligent Unit based on 289 executive responses (189 from higher education and 100 from corporate settings), noted that 54% of higher education respondents and 59% of corporate respondents cited the use of online gaming and simulation software as an innovation likely to be adopted in higher education courses and programs over the next five years (2008, p. 6).

Clearly there is a growing awareness that digital communication skills matter in the classroom and the workplace. In fact, purchasing patterns demonstrate that broad adoption of enterprise-grade, professional software tools for use in all classes is already taking place. Recent licensing data from Adobe Systems Incorporated showed that the use of Adobe professional software (e.g. Photoshop, Flash, Dreamweaver, Adobe Premiere®, and Acrobat) has been expanding outside of the company's historical "core majors" (visual and performing arts, art and design, theatre and drama, web communications, photography, music, game design, and film and animation). Purchasing levels have increased in what Adobe's education leaders refer to as active majors. These majors include architecture, communications, business, education, health sciences, information technology and journalism. Purchasing has also increased in majors outside of the core and active categories, including law, agriculture, liberal arts, mathematics, natural/physical sciences, and social/political science. Specific highlights of Adobe licensing data indicate that:

- 55% of Adobe Student and Teacher Editions sold nationally through online resellers are not in the core majors;
- 50% of Adobe Student and Teacher Licensing software sold through campus-based and online campus stores are outside of core majors;
- Data from enterprise licensing agreements, where institutions make Adobe software available to students and faculty at no cost, show that 85 % of students downloading Adobe software are not enrolled in the core majors.

These kinds of developments should not be surprising, especially when considering the learning benefits derived when people can effectively exploit 21st century digital applications in practice.

Further evidence supporting the value of high-end digital competencies can be found in the 10-year perspective offered by Mark E. Kann, Professor of Political Science and History at the University of Southern California (USC). Kann has been active in a USC New Literacy Project that started in 1998 and has now transformed into an [Institute for Multimedia Literacy](#). He has also helped launch a university-wide, four-year [Honors Program in Multimedia Scholarship](#) in 2004. The goal for this entire spectrum of development that began over 12 years ago and continues today is "to explore how professors across the disciplines could encourage their students to use multimedia technology as a means to engage in research and communicate their findings." Thanks to these innovative programs, a broader population of students have been introduced to visual literacy concepts and notions and trained in how to use image manipulation, website creation, and sound and film editing applications (2009, p. 4).

The first cohort of the USC honors program consisted of 27 students from 15 different majors and seven different departments, including music, communication engineering, theatre, education, dentistry and Letters, Arts, and Sciences (p. 10). A significant number of academic values to students' education have been identified throughout the process of building and analyzing the honors program. These values include students becoming adept users of new media tools and ultimately being better able to "express, understand, and appreciate those facets of knowledge that are more accessible by way of imagery and sound than text." Plus, multimedia scholarship enhances students' analytic skills, develops students' capacity for active learning and creative scholarships and strengthens students' ability to communicate their research and findings to other people (pp. 8-9).

Use of Adobe Products Gaining Momentum

Students, faculty, and staff from disciplines across the campus are recognizing how industry-leading content-creation tools, including Photoshop, Acrobat, Flash, and Dreamweaver, can stimulate and facilitate their creativity while delivering high quality content assets across all varieties of digital media. Whether using Adobe tools in concert with open source and free software, or in conjunction with enterprise LMS and LCMS systems, or on their own, there is a growing recognition that Adobe products enable dependable, scalable, and reliable use in the full range of applications settings found in today's colleges and universities. The benefits of the Adobe products' technical and support services that open source and free software do not offer are well understood.

Even though multidisciplinary networks of individuals and institutions that blend science, technology, and the arts, such as the *Humanities, Arts, Science, and Technology Advanced Collaboratory (HASTAC)* and the *Alliance for Technology, Learning, and Society (ATLAS)*, remain fully committed to the value of open source software, many students and faculty use Adobe products in their learning and teaching endeavors. In interviews with HASTAC representatives, for example, they acknowledge their appreciation for Adobe web development tools including Captivate®, Contribute®, and Dreamweaver, for allowing complete beginners with no working knowledge of code or web design to develop and maintain websites with minimal instruction.

The Art of Scientific Presentations

Professional products are being employed and taught in disciplines outside of the visual arts. Professor Victor Spitzer, Professor of Cell and Developmental Biology at the University of Colorado School of Medicine is affiliated with the *University of Colorado Center for Human Simulation (CHS)*. His long-held research interest is in human anatomy and computed three-dimensional imaging. As evidenced at the Center for Human Simulation, digital scientific medical representations are changing the way that doctors in training learn their anatomy.

As noted on its website, the major goal of CHS is to “develop simulators that provide interactions with computerized anatomy in virtual space.” CHS, in collaboration with the U.S. National Laboratory of Medicine, has long been involved with the production of a three-dimensional, high resolution database of the human anatomy, known as the “Visible Human.” In short, CHS handles 3D data “to generate photorealistic surgical simulations never seen before.” In doing such work, CHS has also actively pursued a research training program to educate what it calls the “anatomist of the 21st century, a new type of anatomist/computer-imaging specialist” — someone who would possess advanced digital skills. “I’m not an artist. I’m a scientist,” Dr. Spitzer wryly observed in a recent interview with Sage Road Solutions LLC researchers. “I don’t need most of the features in Photoshop, but the ones I need, I really need. So, I use the professional [Adobe] product and encourage the doctors we support in our lab to do the same.”

Another example of where advanced digital skills are emerging can be found at the University of Pittsburgh School of Dental Medicine *Center for Dental Informatics*, where an increased emphasis has been placed on teaching students how to create images for quantitative analysis. The Center hosts a Quantitative Image Analysis Project whereby a development team is learning how to create biomedical research educational resources using Adobe Photoshop. The adoption of such software, along with the digital skills students and faculty are garnering through a series of software training courses, is helping the Center publish an array of digital images—such as histological samples, radiological images and various other imaging artifacts derived from diverse lab equipment—for a variety of quantitative analysis procedures (Spallek, H. and Mooney, M.P., n.d., p. 2).

Enhancing Students’ Digital Communication Skills While Creating Meaningful Technology-Based Resources for Educators

The adoption of advanced digital communication skills is certainly not limited to field of medicine. At the University of Houston College of Education Instructional Technology Graduate Program, an *Educational Project-Based Web Design and Development* course facilitates productive collaborations between students, faculty, content experts, and local community-based arts and museum organizations to create meaningful technology-based resources for educators.

Students quickly discover that this teaching, learning, and highly collaborative environment helps them to develop much more than web-design skills, as the course stresses the attainment of more advanced 21st century digital communication skills. Through the use of Adobe Dreamweaver and Photoshop for the creation of their digital storytelling projects, this course of study ultimately helps students learn how to:

- Use productivity, authoring, multimedia, graphic, and web tools
- Plan, facilitate, and assess learner-centered instruction
- Create instructional design and development theories, models, and processes
- Develop effective electronic learning materials to address design, layout, navigation, text, and multimedia
- Use technology to communicate with broad audiences and to locate information through multiple sources
- Work, problem-solve, and conduct research through social interactions in diverse team environments
- Become fluent with technology planning and policy making, and project and information management (Robin, 2004, para 8)

The *Educational Project-Based Web Design and Development* course was first offered in 1997. Since that time it has evolved to include the production of new levels of interactive resources. Students, faculty, and community-based collaborators have created numerous rich-media, technology-based educational, digital storytelling compendiums. One specific example of *The Grandeur of Viceregal Mexico Project*, a website representing a traveling art exhibition of the Museo Franz Mayer art museum in Mexico City (para 10). More examples can be accessed under the category of "Educational Web Projects" at <http://faculty.coe.uh.edu/brobin/homepage>.

Expanding the Skills of Communication Majors at the University of North Carolina

The demand for advanced digital skills has also grown in the field of journalism and mass communication. At the University of North Carolina (UNC) School of Journalism and Mass Communication at Chapel Hill, recent surveys and interviews with graduates, educators, hiring managers at newsrooms and advertising and public relations companies, and professionals in other communication-related job sectors confirm the demand for professional digital skills among graduates. Overall, respondents to the surveys and interviews placed high value on four primary skills: photo manipulation, creating two-dimensional graphics, editing video, and editing sound. Thanks to these research results, courses have been revamped to focus on teaching students how to better use the Adobe Creative Suite, with a focus on Flash.

For example, one of the revamped courses is *J580 Intermediate Multimedia Storytelling*. It covers basic programming, graphic design, and storytelling on the web. Students learn to work within Adobe Flash, learning how to design, storyboard and script interactive digital storytelling presentations. They learn how to incorporate photos, audio, video, text, graphics, and database information into interactive multimedia environments.

Innovative English Courses at the University of Michigan

The Department of English Language and Literature at the University of Michigan offers an innovative course—English 420/516 Technology and the Humanities—that develops students' intermediate technical skills for using Adobe Photoshop, Dreamweaver, and Flash (including ActionScript programming). As noted on the [website](#) for Technology and the Humanities:

The course fosters both sharpened general analytic and presentational skills and technical mastery of a broad range of modern computer-based technologies for collaboration and for gathering, manipulating, analyzing, and presenting electronic data in the humanities... Technical topics include information gathering from digital sources, web authoring, hypertext documents or novels, collaborative technologies, image manipulation, text analysis, and the meaning of the digital revolution.

Group and individual projects created through this course require English majors—most of whom enter the course feeling uncomfortable and unfamiliar with using sophisticated audio, video, and image-manipulation software—to learn ActionScript programming language and publish interactive, animated, and video assets. The course has enabled students to communicate complex opinions, arguments, and positions in creative, impactful ways, as well as help them develop transferrable technical skills using Adobe's industry-standard presentation software. Examples of students' work from various semesters are accessible at http://www.umich.edu/~mmx/humsit_coursework.htm.

The Art of Digital Storytelling

The Center for Digital Storytelling (CDS) is an international pioneer in the field of digital storytelling. Started and headquartered in Berkeley, CA—with offices in Colorado, Washington, D.C., Canada, and the United Kingdom—CDS is a non-profit organization that was once housed in the University of California at Berkeley School of Education. As noted on its [website](#), for the past 16 years, CDS has provided storytelling workshops “in a wide variety of contexts with a diverse number of people, from the techno-savvy to the techno-phobic.”

CDS utilizes a good number of Adobe products for the packaging and dissemination of digital storytelling projects, including:

- Adobe Photoshop to design and prepare photos and images published on DVDs that are frequently part of large-scale and distribution public education and policy advocacy initiatives
- Adobe InDesign® to prepare and organize publications, including curriculum guides, the Digital Storytelling Cookbook, and story-compilation discussion guides
- Adobe Acrobat Pro to format stories for inclusion in multimedia evaluation reports
- Adobe Dreamweaver for the organization of websites

In conjunction with the University of Colorado at Denver, CDS currently delivers a graduate-level [Digital Storytelling Certificate Program](#). The program consists of a three-day intensive *Digital Storytelling Workshop*, a summer semester online course titled *Digital Storytelling in the Curriculum*, and a five-day intensive workshop titled *Leadership for Digital Storytelling*. The program turns out graduates who can create digital storytelling environments using video editing programs and a wide variety of other professional presentation tools. Additionally, they learn how to integrate digital storytelling methods and processes into courses and curricula across the spectrum of post-secondary education.

Through collaborations with educators, business people, and professionals from community, health, human-services, and international-development organizations, CDS has accomplished a great deal in the world of digital storytelling, as evidenced by a good number of [case studies](#) posted on their website.

Moving Beyond Words

Of course, the use of Adobe software tools in academia, across curricula, is really nothing new. But the broad adoption of Adobe software on campus has taken place just outside the range of the typically held view of higher education IT administrators. In many ways the unabated increase in the number of students, faculty, and staff outside of graphic and visual art, videography, and web design who continue to develop advanced digital communication skills has been a “silent transformation,” taking place without a lot of fanfare and national press coverage. Nonetheless, a variety of research results and new courses and programs now offered across disciplines that previously did not emphasize digital skill instruction continue to verify a continuously expanding “digital skill omnipresence,” throughout post-secondary education.

In short, all of these examples show that what and how educators teach is increasingly matching what students need and want to know for survival and relevancy in today’s digital revolution. Perhaps the website for the [National Science Foundation International Science & Engineering Visualization Challenge](#), said it best: “To illustrate is to enlighten.” Learners do not get as clear of an understanding of such complex topics as fractal geometry, the double helix, or solar flares when they are described in words alone.

Post-secondary education is obviously moving beyond words alone with its adoption of 21st century digital communication skills via numerous projects, courses, programs, and collaborative efforts. With each passing day, the call for strong digital proficiencies grows louder. This no-longer-silent transformation has emerged as a pervasive, persuasive, and exciting future across all disciplines.

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