

Transforming Secondary *and* Post-Secondary Curriculum *to* Develop *a* Future Workforce *with* *Proficient Cognitive and* *Interpersonal Skills*

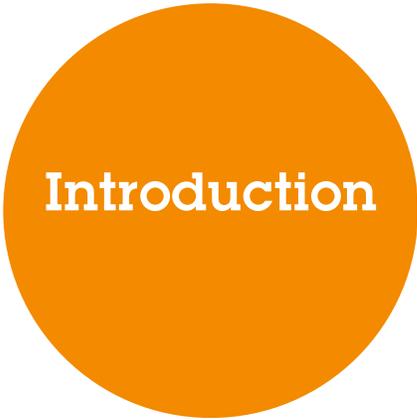
DEVELOPING THE 21ST
CENTURY WORKFORCE

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The Association of
Technology,
Management, and
Applied Engineering



Introduction

Today's educators face classrooms full of students who have grown up as "digital natives" (Rainie, 2006). "They are history's first 'always connected generation'" (Pew Research Center, 2010, p. 1). This demographic of student population is usually defined as a millennial, Gen Y or Gen Z, and has a corresponding age bracket for those under 35 years old (US Census Bureau, 2014; MarketChart, 2014; Schroer, n.d.). In some cases, students will replace Baby Boomers who will be retiring in record numbers in the next 5–10 years; they may also be preparing for jobs that don't yet exist, and utilizing technology that may not exist. The future workforce will require students to have cognitive competencies to interact successfully in tomorrow's workplace (Lippman & Keith, 2009). These cognitive processes and interpersonal skills will allow students to seamlessly transfer their educational knowledge to be successful in their professional positions and become global citizens (The Jobs Council, n.d.).

The processes and talents that should be included are higher levels of thinking, which are considered in Bloom's Taxonomy, among other learning theories that embrace analysis and synthesis; persuasive reasoning; conflict resolution; leadership and teamwork; cross-cultural competencies, along with oral and written communication to ensure that students to become successful employees and industry leaders in the next decade. Many educational theories, including Bloom's, try to define learning goals by hierarchical or scaffolding directives through a process of reasoning skills that create an independent learning environment for the student.

This white paper reviews an industry survey and literature review that support a need to include soft and cognitive skills in career and technical curricula, defines and discusses these skills, and provides specific examples to help educators add these strategies into their curricula in manageable modules versus a large-scale overhaul.

Justification for Teaching Soft Skills

As technology continues to advance at a rapid pace, current students in business, technology, design, and communication must have a broad range of leadership skills that require a complex understanding group of dynamics for teamwork (Andersen, 2014). Employees in these technical fields of the future may also have increased independence to choose their work hours, conditions, and

levels of responsibility. In addition, they might work in teams that are continually modified depending on the project or production workflow. This will require these employees to utilize interpersonal skills in decision-making, communication, and multidisciplinary teamwork (CISCO, 2011).

Similar needs are verified in a survey of business owners and managers of graphic communications businesses (Smith, 2014). The following is a statement that a/n owner/manager gave regarding additional thoughts on skills or competencies that s/he believes employees will need in the next 5–10 years:

Their value that they create is more around communication and it's the soft skills. I just see an absence of it. I think if you possess those types of skills, now you can get anything you want, frankly. I would continue to encourage educators to be sure you don't forget about that. Technology is great, but how is somebody going to communicate it and share it and discuss it and all of those good things.

In addition to this direct statement, the statistical data also supported the value that business owners and managers place on soft skills. For a series of questions related to rating and ranking the importance of technical skills versus soft skills, respondents were asked to first rate, then rank, the following five categories of competencies:

1. General Work Habits—positive attitude, organized, self-starter
2. Communication Skills—communicates clearly and appropriately
3. Technical Skills—computer and software or machine usage as appropriate for the position
4. Graphic Communication Knowledge—understanding of the industry overall, familiar with industry standards, guidelines, and/or trends
5. Project Management Skills—time management, teamwork, problem-solving skills

Respondents could choose only one of these options: Not important, Somewhat important, Important, or Extremely important. For scoring purposes, in Question 6 and the others like it, the choices for each item were: Not important=1, Somewhat important=2, Important=3, and Extremely important=4.

The related question for each job position asked respondents to rank those above five categories of competencies. Respondents selected a number between 1 and 5 for each category, with number one to indicate the most important category, and five to indicate the least important. The scoring for those questions was as follows: 1=5, 2=4, 3=3, 4=2, and 5=1. Figure 1 shows the results of the two questions related to job position of Production Personnel:

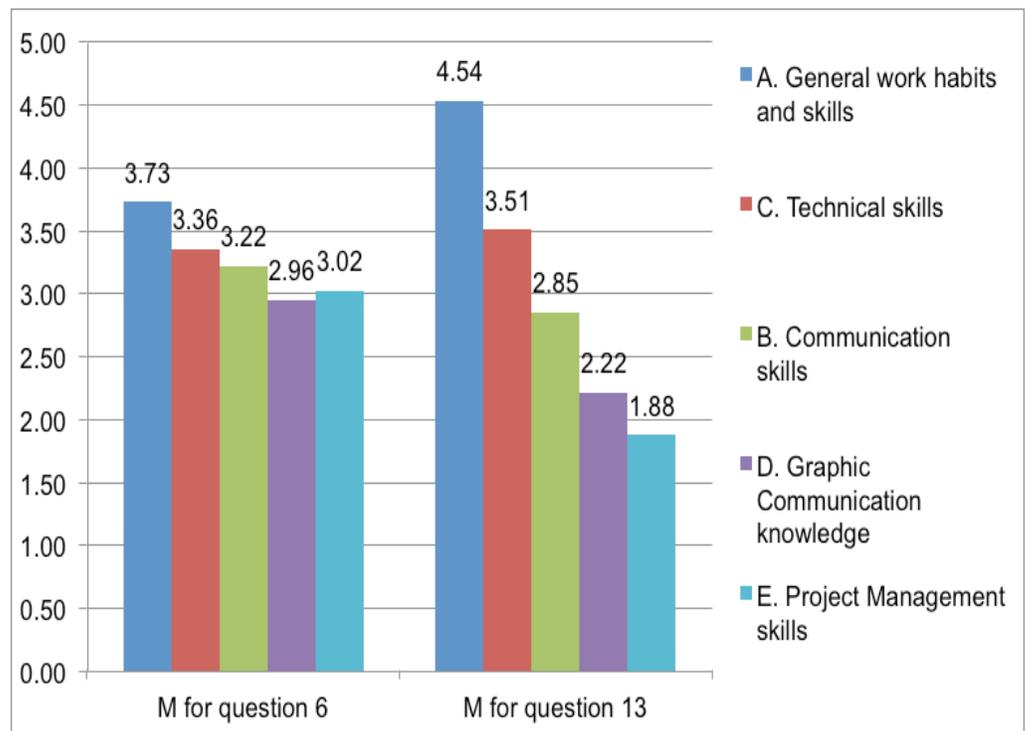


Figure 1. Importance as indicated by rating (Question 9) and ranking (Question 15) required skills and knowledge for Production personnel. *Graphic Communications Industry Trends and Their Impact on the Required Competencies of Personnel, Dr. S. Smith, 2014, p. 104.*

For all seven of the job titles, the results were consistent. General work habits and skills were both rated and ranked as number one for all of the positions. Communication skills were either second or third for all of the positions. In only three of the job titles (Premedia, Production, and Creatives), Technical skills ranked second, just better than third-ranked Communication skills.

One of the final questions on the survey asked for open responses from participants. The question was, “If you were hiring, what would you look for in a graphic communications employee? Please add any additional thoughts on necessary skills.” When these responses are grouped by soft skills versus technical skills, there is a clear preponderance of responses in the former category. See Table 1 for results.

Table 1

Comparison of Open-Ended Responses From Survey Question 18 When Grouped into Soft Skills and Technical Skills.

Soft Skills	Technical Skills
<ul style="list-style-type: none"> • Good attitude • Communication • Teamwork • Listen and take direction • Willing to show initiative • Willing to learn • Effective project management skills • Balance between someone with real talent and one who will accept a lower salary • Excellent work habits • Understanding that the business is about making money, not art • Creative and willing to try new ideas • Punctual • Dressed like a professional • Quality of character, e.g. commitment to integrity and best practices • Flexibility and versatility 	<ul style="list-style-type: none"> • Technically proficient with all applicable software programs (Adobe and Microsoft) • Understand print production and set-up, i.e. bleeds

Note. n=21. Graphic Communications Industry Trends and Their Impact on the Required Competencies of Personnel, Dr. S. Smith, 2014, p. 127.

This section demonstrated the need to include cognitive and interpersonal skills in professional and technical education. After presenting the definition and impact of soft skills, the next section discusses and describes specific strategies and methods to incorporate them into class activities.

Critical thinking skills have a proven positive impact on student success and on their overall collegiate achievements (Friedman et al., 2009). The intellectual behaviors demonstrated in critical thinking, and connected to Bloom's Taxonomy, are not just attributed to problem solving.

Definitions and Impact of Soft Skills

The inclusion of soft skills has been problematic in CTE curricula. Barriers include funding support, external stakeholders, weakness of institutional structures, and government initiatives (Elsner, Boggs & Irwin, 2008; King, 2012). CTE curriculum within the United States has focused mainly on the delivery of detailed lessons, such as specific equipment or software training, and not the relevant processes of “teaching-learning” (Robinson, 2013). This leaves students with the “how” of a technique but not necessarily the “why” or “when” to apply the knowledge and in “what” setting. By ensuring relevance through innovative classroom techniques, the rigor will be entrenched, thus improving complex thinking skills and student success, states a US Department of Education publication (2012).

Critical thinking skills have a proven positive impact on student success and on their overall collegiate achievements (Friedman et al., 2009). The intellectual behaviors demonstrated in critical thinking, and connected to Bloom’s Taxonomy, are not just attributed to problem solving. Bloom’s Taxonomy of learning at the highest level, is the concept of creating (Friedman et al., 2009). This model of knowledge integration can be coupled with creative technical applications to ensure relevancy in delivering necessary workplace skills. The International Center for Leadership in Education (Jones, 2002) defines this as an assimilation of knowledge, where an individual can logically and creatively combine multiple sections of unique knowledge. Dr. Willard R. Daggett from ICLE (2012), described five processes of an action, or acquisition of knowledge to application of knowledge, defined as:

1. Knowledge in one discipline
2. Apply in discipline
3. Apply across disciplines
4. Apply to real-world predictable situations
5. Apply to real-world unpredictable situations

The Application Model describes putting knowledge to use. While the low-end numbers indicate knowledge acquisition for its own sake, the high end signifies action—use of that knowledge to solve complex real-world problems and to create projects, designs, and other works for use in real-world

situations (Jones, 2002, p. 2). By having practice in developing goals, plans, and perspectives in project- and problem-based learning, students are then able to self-regulate and further fuel their own creative and strategic outcomes (Malyn-Smith & Smith, 2013; Reid & Anderson, 2012; Robinson, 2013).

Solutions/Curriculum Approaches

A strong consideration for 21st century learning is the inclusion of structural changes within curricula such as online instruction, hybrid or blended courses, and modules available for 24-hour-a-day access. Blended curriculum typically combines traditional face-to-face classroom interaction and other types of e-learning curricula. Because some millennials do not connect with peers, educators, and technology during the standard school-day timeframe, these alternative learning options allow them to compete globally, on their own time, by leveraging technology innovations by educators who understand seamless transfer of knowledge, to successfully interact with today's students. To include these methods of teaching and delivery, an institution must fund and support professional development so that the economic return will be measurable from the curriculum reform (Barabach & Rauner, 2012).

These modules of instruction can be compiled for digestible bites, or "chunked", as Kate Dins (2005) describes for chunking of professional-technical program curricula. This chunking is a key factor so students can not only teach themselves, but also set the pace of their instruction (Marzano, 2009; Marzano & Toth, 2014; Robinson, 2013). These implemented phases of chunked content reflect positively on e-learning strategies; chunked content might include modules that not only allow students to become self-directed learners but also to interact with peers. If curriculum reform is embraced, it follows that academic rigor and CTE relevance will be represented as knowledge of organized resources that reflect positively on learning strategies, realized in student achievement and success (ICLE, 2004). If educators and learning institutions understand the benefits of reform, they should embrace these smaller classroom experiences as activities and modules for best practices in education. Educators who strategize these experiences support the concepts of connecting education to student talent, motivation, and to diversity by changing education from the ground up, teacher-to-student interaction (Robinson, 2013).

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Educators must also implement multiple-channels of inclusion to develop these cognitive and interpersonal skills for students to be successful as global citizens. Course facilitation can include group learning, demonstrations, exhibitions, guest speakers, video instruction, and reading content—all tailored to the student's own learning style. Educators can also bring current business and industry practices into the classroom by utilizing multidisciplinary teams (Zirkle, 2012). The reasoning skills needed for project management include analyzing a task and related processes, converting the result into usable information, and then communicating it effectively to peers—which group-work activities will incorporate.

These smaller experiences as activities and modules can be full projects or brief in-class exercises, to address any gaps in applying cognitive skills in education. Educators who strategize these experiences support the concepts of “connecting people and use to their collective intelligence” for problem solving (Rose, 2011). Educators must consider technological experiences that use mobile devices in the classroom, as shown in Figure 2. By creating a classroom of active engagement and numerous concept delivery techniques, educators will embed the fabric of learning building on each experience (Carrington, 2013). Educators must utilize technology to its best advantage, thereby empowering students to be all they can be by integrating technology and not simply utilizing technology because it is available, states Allan Carrington (2013) as he describes his sixty-three Pedagogy model.

Figure 2.



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The Padagogy Wheel by Allan Carrington is licensed under a Creative Commons Attribution 3.0 Unported License.. Retrieved from Integrate iPads into Bloom’s Digital Taxonomy with this ‘Padagogy Wheel’ and The Padagogy Wheel V3.0: Learning Design starts with graduate attributes, capabilities and motivation. Retrieved from and based on a work at http://padagogy.net/wp-content/uploads/2013/06/PadWheelV3.0_SMALL.png

An instruction example can include having students aggregating or curating versus creating content, thus developing a student’s critical-thinking skills and judgment in order to evaluate and make the information meaningful. Another recommendation incorporates blogging, where the student is responsible for content and interaction of online discussions; or students could write a paper or complete an industry-related article review, and then presents the results to peers. Additional inclusive options include critiques, role-playing, and so on, to have students develop cognitive abilities higher on Bloom’s Taxonomy, such as synthesis and analysis.

One such module is an asynchronous online discussion board, presented to students as a blog that was added to an introductory communications technology course; the course surveyed the past, present, and future of communication technologies. The positive result of an asynchronous online discussion board that included both soft- (instructor prompts and presence) and hard scaffolding (rubrics) is

evidenced in a study by Giacomo, Savenye and Smith (2012). There was an indication of higher-order thinking skills exhibited, including greater depth and breadth of thinking, along with improved writing skills. The class activity created and implemented by one of the authors was designed to engage students and have them be leaders, work in teams, and practice communication skills on technology-related topics. The asynchronous discussion board was facilitated using an online learning system, in this case, Blackboard. Blackboard provided 24/7 access to all students via a system they were comfortable using; the board saved time for the instructor by providing a framework for a simpler grading system already tied into the class. The student-lead discussion board also allowed the instructor to provide an additional learning activity that would otherwise be too time consuming to reply to and grade all the responses. In addition, because the discussion board continually integrated new information and new examples of communication technologies, it was a beneficial supplement to the instructor-presented material related to more traditional technologies.

In an upper level-course involving digital graphic communications, students focus on the application of many of their previous learning experiences, along with career readiness and portfolio preparation. An in-class activity is based on group work and role-play: students interact with group members to prepare a newsletter—a semester long project—and to think about their own comfort level with their work habits, communication preferences and abilities. Groups of approximately five members are formed. The instructor randomly distributes slips of paper within each group; each slip includes a position name and description including Leader, Devil's Advocate, Slacker, and Team Player (see Appendix A for the entire list with descriptions of each role). Some roles are more self-explanatory than others are, although they all provide examples of behaviors that students can exhibit. For example, a Devil's Advocate, might ask "Should we really be trying to do that?" or "Is that really the best strategy?". Students are instructed to "play it to the hilt" or exaggerate their roles. Students are instructed NOT to tell each other their assigned role, but instead to guess each peer's role as they work. The groups are then assigned to plan advertising materials for a fictitious career week event. As the groups work, students are generally able to guess who has which role within their group.

Besides the activity itself, the debriefing is especially important. First, the group guesses each person's role. After each person confirms or corrects the guess, each discusses his or her comfort level in that role, whether s/he would prefer a different role. Some students commented that although they would like to be a leader in their future career, they were not comfortable with having it thrust upon them. This was consistent with personal interviews conducted by Human Resources personnel in the graphic communications industry; employers indicated that too many employees in entry-level positions expected to start out in management, instead of realizing that they need to work their way up.

This activity works well as a one-time learning experience, yet it has translated into improved work situations for the teams throughout the semester. Several students commented on how at different times they wore different hats, teaching them that they will often assume various roles during their careers.

The role-playing activity connects with the goals of encouraging and practicing higher-level skills by inducing students to be self-directed and to collaborate with peers. As they take on their roles and consider how they will interact with peers in different roles, they learn skills that are important for managers of the 2020 workforce, as described by a CISCO white paper:

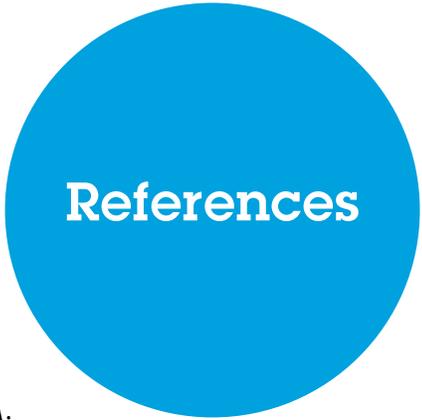
The ability to cognitively assimilate diverse human and organizational elements will be as critical, if not more critical, than traditional managerial or supervisory skills. The new-style manager will value team building and coaching as much as, or more than, taking charge, commanding loyalty, and inspiring the troops (CISCO, 2011, p. 28).

Even middle-level managers will be valued for "exercising their relationship and networking skills: forming and re-forming teams, coordinating among teams, and acting as both vertical and horizontal "transmission belts" in the organization, sharing information, diagnosing problems, raising concerns, coordinating efforts, and identifying possible initiatives and transition points" (CISCO, 2011, p. 28). Consistent with this description, the above class activities support the abilities and talents that will need to be present in the workforce of the future.

While these are just two examples of activities that are added to courses to increase opportunities for higher-order thinking skills, there are many such ideas available. A good source for an alternate way to present material is “Student Engagement Techniques: A Handbook for College Faculty,” by Elizabeth F. Barkley. In her text, Barkley presents creative ideas for various learning situations and fields of study.

Conclusions and Recommendations

A postsecondary educator’s goal is to engage students with methods of investigative inquiry and meaningful context while building critical thinking skills (Friedman et al., 2009). Educators must find a teaching approach that incorporates strategies to bring an independent learning behavior into the classroom to build intellectual character (Reid & Anderson, 2012). Given these goals, educators must re-focus their efforts to create new in-class activities. A full curriculum renovation at one time is not being suggested. Instead, educators must develop and cultivate classroom strategies such as simultaneously facilitating several smaller groups, creating problem-based modules of curriculum, developing motivational discussion questions, and promoting a program closeness (University of Texas, 2014). Educators must examine instructional content as it applies to teaching and learning methodologies, all relevant to how the information is disseminated and received. Utilizing students in this curriculum development process ensures engagement, actively allows students to be more self-directed and contributes to post-college success. Furthermore, “chunking” or modularizing individual learning experiences relevant to the learning goals transforms the content with a more integrated approach. Adding these advanced thinking skills as the core to technical curricula, results in innovative classrooms that build on student talent and achievements, thus developing students that are prepared to lead a global workforce.



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Appendix A

Leader – You take charge and keep order. Help everyone to stay on task, assess problem areas, and assist where most needed. When possible, you direct people and tell them what to do.

Team Player – You work well with others, you're good at getting things done and doing what you're told or what needs to be done. Just gitt'r done.

Time Manager – You make sure the activities keep moving along and that you don't run out of time. Every time the discussion gets off track or everyone gets away from the main purpose, you bring him or her back to focus on the problem at hand.

Slacker – Spend time in Facebook and YouTube, try to show funny videos to people. Do everything except work on the project. If anyone asks for ideas, just give them a blank look and do not offer anything helpful.

Devil's Advocate – Ask a lot of questions, (question everything) and try to cause conflict. You ask the questions to make sure that all ideas/problems are considered and addressed "Are you sure that's the right direction to be going? Do we need to look at the cost for that? Do we have the resources to do that?"

Peacemaker – Do what you can to resolve conflicts. Try to get people to negotiate, compromise and work together. Mediate conflicts within the group as they arise. Think of the phrase "can't we all just get along?"

Visionary – You see the big picture or are good at generating new ideas. Not necessarily one who is good with details but can maintain an overview of how to achieve an end, but not necessarily the step-by-step tasks. You keep suggesting new ideas vs. staying on track with the current one.

Accountant – Understands the financial challenges of staying on project budget and pointing out potential fiscal issues.

Dreamer-schemer- Gets all pumped up initially but then when the actual hard work begins finds other things to do unrelated to getting the job done.

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