



Thought Leadership in Skills:

Skill Sets, Graduate Employability, and Next Steps

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The job market is constantly evolving, and graduates need to demonstrate adaptability and a willingness to learn to remain relevant. Those with a growth mindset and a demonstrated ability to embrace new challenges are more likely to navigate the dynamic job landscape successfully.

Bruno Škrinjarić
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Abstract

Research, literature, and dynamic business environments validate a mismatch between employer expectations and graduate competencies in a global context encompassing Australia, China, Croatia, Ghana, Malaysia, Morocco, Nigeria, Saudi Arabia, South Africa, Spain, the United Kingdom, and the United States. While employers may assess candidates' academic credentials during initial recruitment, general competences assessed during job performance determine retention and advancement. Employers in evolving job markets seek demonstrated adaptability, willingness to learn, and growth mindset. Cognitive skills must be complemented by soft skills such as motivation, organization, resilience, communication, problem-solving, decision-making, leadership, professionalism, self-confidence, and aptitude for working effectively with others. There are many opportunities for policymakers in the areas of economics, education, industry, and workforce development to reimagine and improve the way competency-based learning is approached.

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Context

Economic volatility, digitization, increasing social pressures, and Industry 4.0 affect global labor trends and generate demands for new skill sets (World Economic Forum, 2023). The literature on skills mismatch, graduate employability, and competency-based education reflects the global context. Numerous studies aim to understand employer needs and how to optimize graduate employability.

Review of undergraduate and postgraduate (coursework and research) programs in Australia suggested work-integrated learning strengthened the adaptive skills employers seek in new graduates (Hayes et al., 2023; Jackson & Dean, 2023). Studies of Chinese engineering graduates' employability validated that employers' recruitment criteria prioritize general skills and personality skills (Wu et al., 2023). Assessments of Croatian economic and business graduates indicated a mismatch between the competencies required by employers and demonstrated by graduates (Škrinjaric, 2023). In Ghana, employers evaluate candidates' general skills and personality (Segbenya et al., 2023) while Malaysian studies suggest employers seek graduates who can easily transition between various tasks (Salahuddin et al., 2023). Assessing Moroccan graduates' employability experience, Draissi and Rong (2023) emphasized the importance of complementing cognitive skills with personality skills or soft skills. While the extent of the skills mismatch for employed Nigerian graduates was 60.6%, South African graduates were challenged by employers' preference individuals with actual industry experience (Pitan & Muller, 2023). In Saudi Arabia, data demonstrated gaps between accounting education programs and employer demands (Alsughayer & Alsultan, 2023) and described employers' needs for graduates with "organizational skills, entry-

level digital skills, problem-solving skills, teamwork, subject-related skills, goal-oriented characteristics, communication capabilities, decision-making abilities and creativity” (Bhatti et al., 2023, p. 207). Research conducted by Albert et al. (2023) and Albert & Davia (2023) on education mismatch in Spain reaffirmed a need for public policy intervention. Researchers on the United Kingdom experience with employability challenges revealed challenges in developing viable apprenticeship programs (Brockmann & Smith, 2023) and endorsed grants and loans to support lifelong learning (Wilkes & Parkes, 2023), while in the United States, studies on management majors’ employability indicated additional research is needed to identify skill sets employers view as essential (Routon et al., 2023).

Consolidated data on workforce transformation strategies for 2023-2027 from 803 companies employing over 11.3 million workers across 27 industries and 45 economies indicated the following top 10 core skills in 2023 (World Economic Forum, 2023, Figure 4.2), corroborated by other data (Dewar, 2023; NACE, 2023; PwC Global, 2023; Statistica, 2023):

1. Analytical thinking
2. Creative thinking
3. Resilience, flexibility, and agility
4. Motivation and self-awareness
5. Curiosity and lifelong learning
6. Technological literacy
7. Dependability and attention to detail
8. Empathy and active listening
9. Leadership and social influence
10. Quality control

Change is the order of the day: Employers anticipate that 44% of workers' skills will be disrupted by 2027, requiring skills training for 60% of workers. While six in 10 workers will require training before 2027, only half of workers access to adequate training opportunities today. Organization representatives were optimistic about developing the existing workforce, expressed concerns about the availability of adequate talent, and reiterated skills gaps and talent shortages as significant challenges impeding industry growth. Respondents expressed confidence in developing their existing workforce, however, they are less optimistic regarding the outlook for talent availability in the next five years. Accordingly, organizations identify skills gaps and inability to attract talent as key barriers preventing industry transformation (World Economic Forum, 2023).

Employers in evolving job markets seek demonstrated adaptability, willingness to learn, and growth mindset (Škrinjarić, 2023) and 50% of all employees will need reskilling by 2025 due to increased technology (ManpowerGroup, 2023, slide 15), leading to increased employee interest in acquiring and/or maintaining requisite job skills. ManpowerGroup survey data indicated 57% of employees pursue training outside of work because company training does not teach them relevant skills, advance their career development, or help them stay competitive in the labor market (ManpowerGroup, 2023, slide 15). Research studies indicate cognitive skills must be complemented by soft skills such as motivation, organization, resilience, communication, problem-solving, decision-making, leadership, professionalism, self-confidence, and aptitude for working effectively with others. Opportunities abound for economic, education, industry and workforce policymakers to reimagine competency-based learning.

What To Do About It

Evidence-based data confirm skill misalignment adversely affects the economy by reducing organizational performance and individual worker effectiveness (OECD, 2022; OECD, 2023). In a study of the ramifications of regional qualification gaps, Corradini et al. (2023) linked aligning skill sets in local human capital with demand to increased productivity, innovation, and competitive advantage. Surveys of challenges encountered by organizations attempting to reinforce cybersecurity resources as a precursor to corporate expansion indicate the most persistent deterrent is lack of versatile and multi-skilled cybersecurity professionals (Daniel et al., 2023). Prioritizing a competent and skilled workforce is requisite to leveraging corporate opportunities in the digital age (Fossatti et al. 2023; Škrinjarić, 2023). Innovative perspectives on aligning skills with workplace realities include modifying pedagogy, process, and policy.

Building upon a well-established academic tradition, researchers targeting existing pedagogy (King, 1993, Marquedt & Banks, 2010; Neck & Greene, 2011) cite statistically positive relationships between student-centric teaching methods and the probability of acquisition of practical employability skills (Haugland et al., 2022; Segbenya et al., 2023). Learner-centered approaches were defined as “field trips, work-based learning, problem-based learning, brainstorming, and role-play” (Segbenya et al., 2023, p. 820). Researchers further correlated summative assessments (e.g., project work, long essays, dissertations) with optimizing graduates’ employability skills (Alharahsheh & Pius, 2019) by strengthening “communication (written and oral), leadership, presentation, research, and data analytical skills” (Segbenya et al., 2023, p. 821).

Corporate recruitment processes now focus on assessing individual skills over industry experience due to graduate underperformance (Smet et al., 2022; Fossatti, 2023). Google, Apple,

IBM, and accounting firms have transitioned focus from academic credentials to multi-skilling aptitude, defined as an individual's capacity to be trained in transferrable skills and/or more than one skill or proficiency (Pitan & Muller, 2023). Multi-skilling encompasses adaptability, flexibility, resilience, innovation, interdisciplinarity, communication, interpersonal and teamwork, analytical, information and computer technology, and emotional intelligence skills (Hayes et al., 2022; Pitan & Muller, 2023).

Corporate hiring policies are also shifting as human resources professionals seek to narrow skills gaps (Winiarski, 2023). Policy initiatives include implementation of training and skills development activities including seminars, online modules, coaching, and mentoring/micro-mentoring. To promote an institutional culture of lifelong learning, employers are creating experiential opportunities such as apprenticeships, on-the-job training, on-site off-the-job training and off-site off-the-job training (Deschênes, 2023).

Policy implications reaffirm interdisciplinary perspectives suggesting proactive initiatives by all stakeholders: Educators across all levels should align curricula with employer needs and supplement classroom resources with non-formal training to prepare students for the workforce (Škrinjarić, 2023).

Case Study: Highlighting Skills Related Assets/Research

A university in the southwestern United States decided to reframe its challenges as opportunities and launched a "systems change road map" (NGA, 2020, p. 9) engaging educators, students, graduates, and industry. These diverse stakeholders offered perspectives on skills employers seek in EdD and STEM graduates and how higher education institutions may provide the skills required by the market. Results from these studies are highlighted below.

Edd Students and Employers of Edd Graduates

In a mixed method study of current Doctor of Education (EdD) students and employers of Doctor of Education (EdD) graduates, respondents commented on the alignment of the EdD curriculum with industry-specific needs. The study used a sequential explanatory strategy, with quantitative correlation as the primary method/design and qualitative/explanatory case study as the secondary method/design. The survey instrument was based on the National Science Foundation's Early Career Doctorates Survey Questionnaire for a web-based survey (NSF, 2017), complemented by field-tested qualitative components. The survey questionnaire comprised four rating scale questions and two open-ended questions. Quantitative data correlated program curriculum and upper-level job requirements in higher education; qualitative data provided participant narratives. After earning IRB approval:

- A 6-item web-based questionnaire with scale rating and open-ended questions was emailed to 97 current EdD students in the southwestern United States who met the study selection criteria. Inclusion criteria included currently active (defined as posted to the classroom within the last 365 days) students in the EdD program who completed their first eight courses with a B- or better. Data were collected between August 6, 2021, and September 6, 2021; data analysis included the 11 completed responses.
- A 6-item web-based questionnaire with scale rating and open-ended questions was emailed to 52 employers of EdD graduates who had completed the program between April 9, 2018 and January 6, 2021 in a university in the southwestern United States. Data were collected between May 23, 2022 and July 23, 2022; data analysis included the 36 completed responses.

Responses to the quantitative question regarding internships/training programs strongly validated that applied projects, team-based problem-solving or entrepreneurial experiments, internships, community-based learning, simulations, and other direct application learning opportunities prepare graduates for workplace success:

Quantitative Question on Internships/Training Programs	EdD Students Agree/Strongly Agree	Employers of EdD Graduates Agree/Strongly Agree
To what extent do you agree or disagree that internship programs or training on employment searches prepare graduates for workplace success?	82%	84%

Responses from EdD students to the two open-ended questions indicated recurring themes consistent with research reported in current literature:

	EdD Students	Themes
5	How could the EdD curriculum be improved to better prepare graduates for employability?	<ul style="list-style-type: none"> ▪ Experiential learning and internships ▪ Career development training
6	How could universities better prepare their EdD students with the knowledge and skills needed in their professional career?	

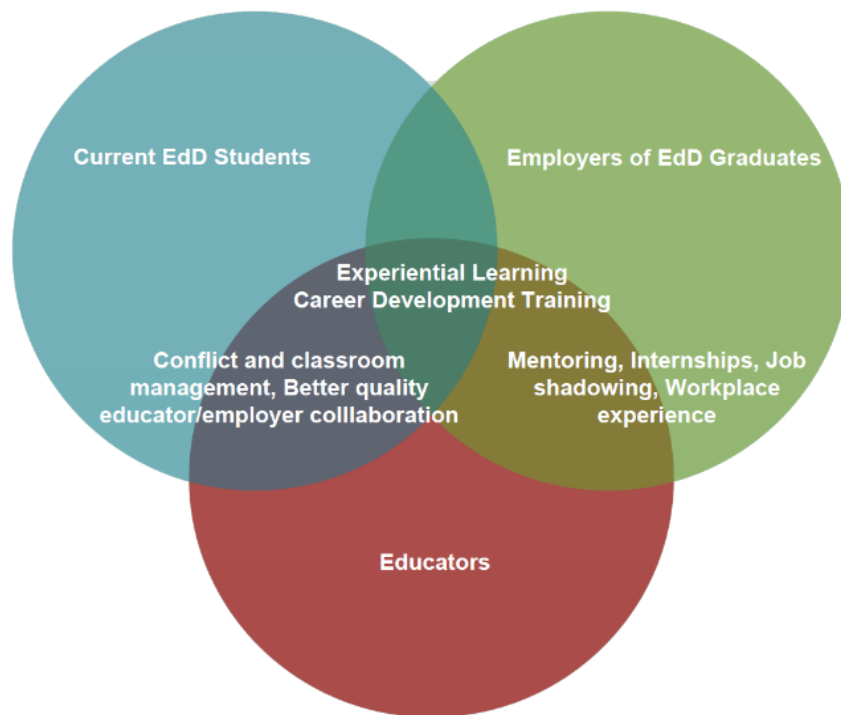
Responses from employers of EdD graduates to the two open-ended questions indicated recurring themes consistent with research reported in current literature:

	Employers of EdD Graduates	Themes
5	What modifications to EdD curricula, defined as specific knowledge and skills that should be included in required coursework, would better prepare EdD graduates for workplace success?	<ul style="list-style-type: none"> ▪ Conflict and classroom management ▪ Mentoring, internship practicum, job shadowing, workplace experience ▪ Better quality educator/employer collaboration
6	In what ways should employers collaborate with universities to prepare EdD graduates for workplace success?	

Key takeaway: Improving graduate employability represents a win/win/win/win scenario: Graduates win. Employers win. Educators win. Economies win. Eliminating silos separating stakeholders is simple, cost-effective, and evidence-based.

Figure 1

Improving Graduate Employability – Win/Win/Win



Note: Developed by the authors.

Employers' Perspectives on STEM Graduates' Skills

In a mixed method survey of STEM employers in the United States, respondents commented on the alignment of the STEM curricula with industry-specific needs. The study used a sequential explanatory strategy, with quantitative correlation as the primary method/design and qualitative/explanatory case study as the secondary method/design. The survey instrument was

based on the National Science Foundation’s Early Career Doctorates Survey Questionnaire for a web-based survey (NSF, 2017), complemented by field-tested qualitative components. The survey questionnaire comprised four rating scale questions and two open-ended questions. Quantitative data correlated academic curricula and STEM graduates’ soft, hard, and transferrable skills; qualitative data provided participant narratives. After earning IRB approval:

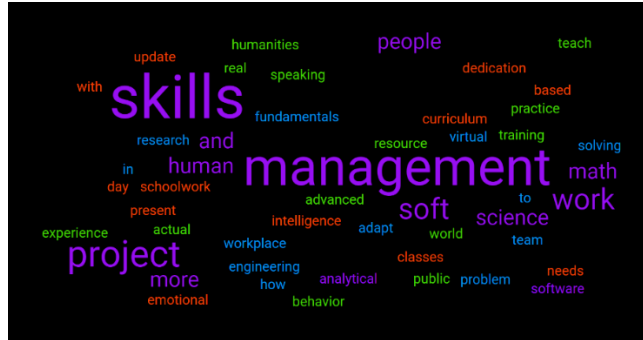
- A 7-item web-based questionnaire with scale rating and open-ended questions was emailed to 1,553 U.S. employers of STEM graduates of a university in southwestern United States, 7,291 U.S. partners of the United States Association for Small Business and Entrepreneurship (USASBE), and 53 SurveyMonkey Audience U.S. engineers who employed STEM graduates. Data were collected between May 31, 2023 and September 30, 2023; data analysis included 62 completed responses.

Responses from STEM employers to the quantitative question on internships/training programs strongly validated that experiential learning opportunities prepare graduates for workplace success.

Quantitative Question on Internships/Training Programs	STEM Employers Agree/Strongly Agree
To what extent do you agree or disagree that internship programs or training on employment searches prepare graduates for workplace success?	76%

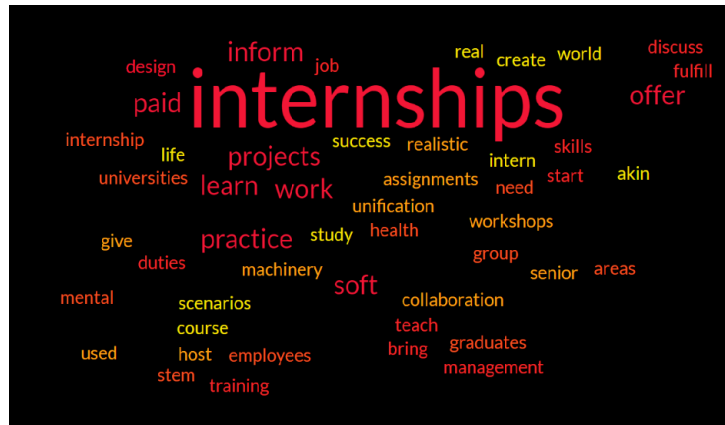
Responses from STEM employers to the two open-ended questions indicated results consistent with research reported in current literature.

Qualitative Question 6: In terms of specific knowledge and skills, what modifications to STEM curricula and required STEM coursework do you recommend to better prepare STEM graduates for workplace success?



- | | |
|--|---|
| <ul style="list-style-type: none"> • Project management • People skills • Soft skills | <ul style="list-style-type: none"> • Emotional intelligence • Human behavior • Skills management |
|--|---|

Qualitative Question 7: In what ways should STEM employers collaborate with universities to prepare STEM graduates for workplace success?



- | | |
|---|--|
| <ul style="list-style-type: none"> • Internships • Workshops • Real world experience | <ul style="list-style-type: none"> • More realistic class assignments • Train how to work in a group • Practice |
|---|--|

Curriculum Map is the Foundation

During the Online Learning Consortium (OLC) Innovate 2023 Virtual Conference, April 3-6, 2023, Mary Elizabeth Smith, Learning Innovation Strategist at University of Phoenix, Shelly

Hodges, University of Phoenix, and Eve Krahe Billings, Dean, Academic Innovation and Evaluation at University of Phoenix, discussed their initiative to “close the skills gap for students between higher ed and industry needs by mobilizing stakeholders across the university, including those outside the classroom” (Smith et al., 2023, abstract).

This approach used Lightcast labor market data to identify skills and curriculum maps to align one skill to one outcome. The speakers detailed “what steps we took to successfully vision, design, and implement a skills-aligned curriculum framework focused on career identification and development across all academic programming at the University” (Smith et al., 2023, abstract). Dr. Billings’ response to a chat box inquiry on how employers can use this information to reskill and upskill accentuated the importance of collaboration: “There's a strong connection that can be made between the groups that reach out to community partners and let them know what offerings the university has available to upskill. It's also the university's responsibility to be comfortable iterating that curriculum to reflect what that employer partner might need” (E. Billings, personal communication, April 4, 2023).

Figure 2*Skill-Aligned Curriculum Map*

Skill-Aligned Curriculum Map

Example portion of the curriculum map from the M.S. Counseling / Clinical Mental Health Counseling program.
Finalized curriculum maps are digitized in online outcomes management tool.

Course ID	Course Title	Course Skill	CSLO	Program Student Learning Outcomes			ULGs	CACREP	Skill Descriptor
				Professionalism	Psychotherapy	Clinical Assessment			
CCMH/515	Legal, Ethical, and Professional Issues in Counseling	Professional Legal Liability	Explain legal responsibilities of the counseling profession.	Introduce			ULG.1: Professional competence and values	2F.1i, 2F.1g, 5C.2i, 5C.2l, 5C.3c	Recognition of differences between legal responsibility and ethical obligations. Awareness of state laws surrounding the counseling profession. Understanding of duty to warn
		Ethical Responsibility	Explain ethical responsibilities of the counseling profession.	Introduce			ULG.1: Professional competence and values	2F.1d, 2F.1e, 5C.2i, 5C.3e	Identification of ethical issues associated with individuals seeking counseling services. Awareness of ethical counselor behaviors when working with clients and special populations
		Ethical Decision-Making Model	Apply ethical decision-making models for resolving ethical dilemmas.	Introduce			ULG.2: Critical thinking and problem solving	2F.1i, 2F.1k, 2F.1l	Identification of the steps in an ethical decision-making model. Application of the ethical decision-making model to ethical dilemmas in a case study. Analysis of outcomes to arrive at an ethical resolution.
CCMH/558	Crisis Intervention and Trauma	Ethics in Crisis Counseling	Identify ethical obligations in crisis and trauma counseling.	Reinforce			ULG.2: Critical thinking and problem solving	2.F.1.i, 2.F.5.k, 2.F.5.m, 5.C.2.l	Intentionally Left Blank
		Crisis Intervention	Apply theory-based strategies in crisis and trauma counseling.		Reinforce		ULG.4: Digital Fluency	2.F.5.h, 2.F.5.i, 5.C.1.c, 5.C.3.a	Intentionally Left Blank
		Crisis Assessment	Apply crisis and trauma assessment techniques.			Reinforce	ULG.4: Digital Fluency	2.F.5.h, 2.F.5.l, 2.F.5.m, 2.F.7.c	Intentionally Left Blank

Note: Used by permission, granted January 24, 2024; Smith, Hodges, & Billings, (2023, April 4), Curriculum to careers: Radical collaboration in assessment, analytics, and design. Online Learning Consortium (OLC) Innovate 2023 Virtual Conference, April 3-6, 2023.

Key takeaways:

- Internship programs or training on employment searches prepare graduates for workplace success.
- Adapt curricula and instructional course design to incorporate workplace competencies.
- Inspire graduates' commitment to lifelong learning.

Successes and Opportunities

- Validating employer interest in and support of university/industry partnerships.
- Identifying strategies to build university/industry partnerships, such as using labor market data including LinkedIn Talent Insights and Lightcast (Gray, 2022).

- Identifying alternatives to curriculum redesign, such as experiential opportunities and hands-on components where students work with ‘messy data’ and tackle interesting challenges for a company (Gray, 2022; Gray & Koncz, 2022; Green et al., 2023).
- Expanding use of career centers (Gray & Collins, 2023) and composition of career influencers to encompass faculty, advisors, residential hall staff, new student orientation leaders, deans, registrar’s office staff and beyond (Stebbleton & Ho, 2023).
- Leveraging career influencers to foster career-readiness in students (“Every conversation can be a career-related conversation”) and promote “career with confidence” (Stebbleton & Ho, 2023).

Next Steps

In July 2020, research conducted by the National Governors Association Center for Best Practices identified a “systems change road map” (NGA, 2020, p. 9) to engage educators, industry, policy makers, and workers in creating a future-ready workforce (NGA, 2020). Adapting education and training to evolving skill needs is fundamental to preparing global citizens for a dynamic economy (OECD, 2022) and should complement career guidance to inform, guide, and motivate adults to embrace lifelong learning (Vergolini, 2023) and navigate career options in an unpredictable economic environment. Synthesizing the concept of employability with learning initiatives and assessment practices can form the lifelong learning mindset that creates future-ready citizens (Škrinjarić, 2023).

In the spirit of the National Governors Association “systems change road map” (NGA, 2020, p. 9), a recent study delineated thought-provoking insights on how higher education institutions (HEIs) might improve graduate employability, defined as “the

condition of providing employment (companies) and the skills and competencies needed to have a job (employee)” (Fossatti et al., 2023, p. 2). First, the authors introduced the “co-creation” concept as “interaction between companies and HEIs can allow the co-creation of programs and projects that benefit both parties. Success in this collaboration requires HEIs to understand the skills needed by companies, the different levels of (visitor, planner, cooperater, and co-educator) (Fossatti et al., 2023, p. 7). Next, the authors listed specific questions to improve the mutual gains (Fossatti et al., 2023, p. 8).

Researchers investigating strategies to provide students with transferrable skills to improve employability (Pitan & Muller, 2023) concluded that utilization of experiential learning and career guidance activities improved students’ perceived preparedness for work. In other words, higher education institutions can improve graduate employability by raising the level of student exposure to experiential learning and career guidance activities (Pitan & Muller, 2023). Experiential learning activities included career workshops, employer presentations, field trips, and participating in alumni talks about their career paths and opportunities.

Pitan and Muller (2023) urged policy makers to mandate that higher education institutions formalize student participation in experiential learning and career guidance activities, develop networks and workshops with industry, and invite employers to engage in curriculum development and delivery. The authors further posited that engaging students with career guidance activities is a requisite to raising graduates’ consciousness of skills required in the workplace. It is, therefore, incumbent upon higher education institutions to provide and ensure student utilization of training in resume/CV preparation and job interviews.

Assessing how engineering students’ communication skills affected employability, Wu et al. (2023) reaffirmed the importance of strengthening general or “soft” skills to promote

graduates' ability to compete successfully in the labor market. To meet changing employer demands, schools are integrating digital age models into engineering coursework, complemented by training processes that include actual project participation, workflows, and scenarios (Wu et al., 2023). Educators are urged to align curricula with market demand to improve students' skills and transform teaching methods to incorporate multimedia and virtual laboratories. An emerging priority is for educators to collaborate with industry partners to infuse practical application exercises into current academic content (Wu et al., 2023).

Johns Hopkins University's Center for Leadership Education researchers Russell and Coghlan (2023) validated the importance of integrating leadership and management competencies into engineering curricula. While course content focuses on technical knowledge, curricula lack explicit instruction in leadership, interpersonal skills, team citizenship, and conflict management (Malhotra et al., 2023). Integrating practice opportunities through experiential coursework such as cornerstone, capstone, senior design projects, and extracurriculars represents a first step toward "the complete engineer" (Russell & Coghlan, October 4, 2023). Two illustrative extracurriculars:

- SAE International is a global association of more than 128,000 engineers and related technical experts in the aerospace, automotive and commercial vehicle industries, promoting life-long learning. SAE leverages resources to create competitions that simulate real-world engineering design projects and their related challenges, such as Baja SAE® in which engineering students design and build off-road vehicles capable of surviving rough terrain (SAE, 2024).

- The Design/Build/Fly competition is an "opportunity for university students to apply real-world aircraft design experience by giving them the opportunity to validate their analytic studies. Student teams will design, fabricate, and demonstrate the flight capabilities of an unmanned, electric powered, radio-controlled aircraft which can best meet the specified mission profile" (AIAA, 2024, para. 1-2).

Research on STEM graduates could help STEM colleges and universities understand how graduates are meeting the industry skills needed and whether or not STEM curricular programs equip graduates with real-life and real-work skills.

Conclusion

Employers in evolving job markets seek employees with demonstrated adaptability, willingness to learn, and growth mindset. Cognitive skills must be complemented by soft skills such as motivation, organization, resilience, communication, problem-solving, decision-making, leadership, professionalism, self-confidence, and aptitude for working effectively with others. The good news? Opportunities abound to reimagine competency-based learning. Collaboration between educators, employers, employees, and policymakers can create an ecosystem to promote continuous lifelong learning.

Success is achieved when students graduate not only with knowledge, but also with the self-assuredness to navigate the dynamic future of work.

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(Gray, 2023)

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