ITE’s Role in Addressing the Gap in Soft Skills Among Students and Early Career Transportation Professionals

Client Interaction
Communication
Ethics
Project Management
Public Speaking
Teamwork

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LeadershipITE (LITE)

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EXECUTIVE SUMMARY

Substantial efforts have been invested in developing the technical skills that are most important to successful careers across a broad spectrum of transportation disciplines. This has included critical reviews of curricula in university-level engineering, computer science, planning, and logistics programs. Professional certification and licensure programs have helped to provide consistent standards with respect to these technical skills. However, there remain important gaps in the skillsets of early-career transportation professionals, particularly with respect to “soft” (i.e., non-technical) skills such as oral and written technical communication, leadership, teamwork, project management, and client interaction.

The purpose of this project was to assess this soft skills gap through a review of research literature, an inventory of existing training and outreach programs, and an industry survey. These tasks resulted in the identification of the most important soft skills from the perspective of the transportation industry, an evaluation of how well each of these skills is currently being met by early-career transportation professionals, and the identification of those skill areas where formal training programs are most critically needed.

The results showed the most important soft skills from the perspective of industry were teamwork, ethics, and various forms of technical communication, including face-to-face, telephone, and e-mail communication, as well as report writing. Several important skills, such as client interaction, leadership, and project management were not rated as highly. These more nuanced skills are often acquired directly as part of on-the-job training, similar to proposal writing, which was also viewed as less important to those at early stages of their careers.

In general, early-career professionals were found to be strongest in those areas that were most important. This finding suggests that the educational and work experiences acquired through university programs, co-ops, and internships are well aligned with industry expectations with respect to these skill areas. However, the general level of preparedness across ten specific soft skill areas was found to be relatively low, with only four of the ten skills having an average rating above 3.0 on a five-point scale, which suggests that significant improvements can be made in most of these areas.

The Institute of Transportation Engineers (ITE) is well positioned to address this gap in soft skills through the development and implementation of various policies and programs. To this end, it is recommended that a training program is developed targeted toward early-career (i.e., first five years) professionals. This program could be strengthened through lessons learned by complementary ITE initiatives, including Student Leadership Summits and LeadershipITE.

ITE is also encouraged to create and foster partnerships with partner organizations, including technically-focused professional societies and organizations focused on soft skill development and training. For such programs to be optimally effective, it is recommended that soft skills development is explicitly integrated into the ONE ITE initiative, which would allow for consistent delivery of soft skill related training and outreach programs across District-Section-Chapter (D-S-C) leadership. Successful implementation would also require strong collaboration between ITE, academia, private industry, and public agencies.
1. INTRODUCTION

Recently, extensive efforts have focused on identifying the skills that are most critical to the success of transportation professionals. This builds upon decades of research literature, much of which has examined the content covered as a part of transportation engineering courses in civil engineering undergraduate curricula (Hoel, 1982; Khisty, 1986; Turochy, 2006; Turochy et al., 2013; Hurwitz et al., 2016). Many of these studies have focused predominantly on technical skills and how such skills are acquired within a university setting, with a primary emphasis on core fundamental areas such as planning, design, operations, safety, economics, and finance.

For example, the National Transportation Curriculum Project (NTCP) brought together transportation educators from across the U.S. to develop activity-based learning modules for the introductory course in transportation engineering. This work was catalyzed by a 2009 Transportation Engineering Educators Conference, which was aimed at building consensus among faculty and industry partners as to how to improve the way introductory transportation engineering courses are taught given significant variability in the depth and breadth of coverage among the 224 civil engineering programs across the United States. The conference ultimately allowed for identification of the need for: (1) a set of knowledge tables highlighting the topic areas of greatest importance to the field; (2) pedagogical strategies that allow for active learning within the context of transportation engineering; and (3) collaborative tools that allow for the sharing of course materials across universities.

Subsequently, a working group of transportation educators has developed learning outcomes and knowledge tables across ten transportation subject areas, presented details of this work at various conferences and workshops, and disseminated the results through various publications (Beyerlein et al., 2010; Kyte and Young, 2010; Sanford Bernhardt et al., 2010; Bill et al., 2011). These efforts culminated in a model curriculum for transportation engineering education (Young et al., 2011; Sanford Bernhardt et al., 2013). Following from these efforts, 2014 report detailed the evolution of transportation engineering in Canada (Haas and Falls, 2014) while additional research has assessed the prevalence and efficacy of various instructional practices in the domain of transportation engineering education (Hurwitz et al., 2015; West, 2018).

The Transportation Research Board has published a report documenting the workforce challenges facing the transportation industry in the future (TRB, 2013). These challenges are both of a technical nature, due to evolutions in technology and the way transportation is provided, as well as to changes in the workforce, which include large numbers of pending retirements and transportation solutions that are increasingly multidisciplinary in nature. While these issues have been long recognized by the transportation industry (Sussman, 1995; Mason, 2003), substantive efforts are needed to address these concerns.

This has motivated several recent projects completed as a part of the Institute of Transportation Engineers (ITE) LeadershipITE program. As a part of the 2017 program, one report examined the question, “How is college curriculum covering emerging trends and changes in the transportation industry, and should ITE help facilitate best practices and/or content?” (Bailey et al., 2017). This built upon a 2016 project that assessed the role of ITE in student engagement and motivating students to pursue transportation careers as a part of primary and secondary educational programs (Bergin et al., 2016).
While there has been substantive work in identifying the most important technical skills for contemporary and future transportation professionals, one opportunity area that deserves greater focus is the importance of soft (i.e., non-technical) skills among early-career transportation professionals. State DOTs and private transportation agencies have indicated that teamwork, lifelong and self-learning, and critical thinking are among the most important soft skills for early-career transportation professionals while local agencies tended to value innovation, ethics, and creativity (Younkin and Savolainen, 2018). Unfortunately, recent industry surveys have identified important skills gaps as students transition to industry from the classroom. Among 171 survey responses from employers to a 2017 ITE survey, 15% believed there were significant gaps in technical writing skills, 10% felt there was a deficit in communication and public speaking skills, and gaps were also noted in ethics, leadership, conflict resolution, and other areas germane to professional practice (Bailey et al., 2017).

In self-assessments, students have found themselves to be less prepared in several areas upon graduation, including the ability to conduct an effective oral presentation, deal with an ethical dilemma, and evaluate risk (Itani and Srour, 2015). Additional research has found undergraduate engineering students to be least proficient in time management, creativity, and innovation, which is particularly concerning as these traits are often found to be important for career advancement. Students also have varying perceptions as to the importance of various skills, with responsibility, time management, and meeting deadlines being particularly important (Direito et al., 2012).

Enhancing these and other soft skills is important as the transportation workforce becomes more flexible and agile in order to adapt to evolutions in how transportation services are delivered, in addition to meeting changing needs and values in the community (Sinha et al., 2002). There is also a challenge to develop "global engineers" by enhancing cross-cultural skills (e.g., foreign language, cultural knowledge, social awareness), offering cross-cultural training, and providing opportunities for internships and co-ops overseas (Del Vitto, 2008).

It is important to recognize that U.S. universities generally provide more balanced coverage of soft skills as compared to programs in other countries that are nearly exclusively focused on technical content (Cheah et al., 2005). Many soft skills are targeted through emerging instructional methods. For example, the use of project-based learning has been linked to improvements in teamwork, enthusiasm, and self-confidence, as well as academic performance and active learning strategies appear to be particularly beneficial for higher performing students (Weir, 2004). Additional research has shown that courses requiring students to utilize soft skills as a part of real-world projects leads to positive effects on problem-solving, teamwork, time management, leadership, and technical communication (Park and Anderson, 2004; Walters and Sirotiak, 2011).

However, industry feedback and the research literature collectively suggest that additional efforts are warranted to improve these skills among entry-level employees. The purpose of this project is to conduct an in-depth assessment of the gaps in soft skills among students and early-career transportation professionals. The results of this assessment will inform short- and long-term strategies through which ITE and other stakeholders can address this skills deficit.
2. THE IMPORTANCE OF SOFT SKILLS TO TRANSPORTATION PROFESSIONALS

Comparisons of feedback from engineering students, faculty, and professionals have shown that academic programs generally fail to develop many skills that are important and desired by industry (Nguyen, 1998). Given the emphasis on technical competencies discussed previously, there is often an associated weak focus on non-technical, or “soft” skills, such as communication, management, leadership, and teamwork (Selinger, 2004). Instead of in a classroom setting, these skills are often “learned the hard way” through real-world work experience (Kumar and Hsiao, 2007). Compounding this problem, in the day-to-day work of transportation professionals, soft skills are often not considered as important as technical skills. As with the academic programs, engineers often have deficiencies with these skills and may tend to prioritize development of technical skills over other equally important skills. However, these skills enable professionals to effectively navigate a wide variety of social and professional situations and are critical to career advancement, as well as to helping transportation companies, agencies, and professional societies to achieve their own goals and advance the profession.

This section details the soft skills that were identified as being most important as a part of this project. Initially, brainstorming sessions led to the development of an extensive list of skills. This preliminary list was subsequently reduced through a series of meetings among team members and consultations with other transportation professionals. The following discussion highlights some of the skills that the group ultimately identified as being crucial.

2.1 Communication

In order to be fully effective in their jobs, transportation professional should be proficient in their requisite technical skills, in addition to being able to serve as an effective speaker, writer, and listener. Effective communication skills are crucial to both company and personal career success. It is important to acknowledge that this communication can occur in several forms in a professional environment. This includes communication with various colleagues, clients, and the general public, which can occur in several forms including face-to-face, on the phone, via e-mail, or across social media.

It is important to acknowledge that the requisite skills are not necessarily uniform across these communication media. In any of these cases, if a professional cannot convey their ideas and plans effectively, they will be much less effective as a technical professional. Upon entry to the workforce, professionals generally have at least some degree of useful experience in one-on-one communication with supervisors and colleagues, which they have acquired through team-based assignments and projects in a university setting, as well as similar practical experiences through internship and co-op programs. These contexts also provide students with a general understanding of the importance of being able to communicate the technical details of transportation projects in a manner that is understandable to elected officials, the general public, and other groups that have a lesser degree of technical proficiency.

More recently, additional concerns have arisen given the increasing frequency with which communication occurs via e-mail in a professional setting. To this end, e-mail etiquette has become a concern, particularly among early-career professionals who may be less aware of the principles of behavior that one should use for technical communication. While e-mail is one of the most used means of communications, this medium is generally utilized in a more casual manner than letters,
memos, etc. and there is less clarity in terms of guidelines for e-mail communication. Related concerns, which apply to other forms of communication, as well, include responding in a timely manner. A particular drawback of e-mail in this regard is that other parties are generally unaware of the status of outgoing e-mails unless the recipient acknowledges receipt of the email.

2.2 Public speaking
Public speaking is a necessary skill for the transportation work force, particularly as it relates to relaying content that is often complex and very technical, to a diverse range of audiences. As a part of the process of delivering a message to an audience, the speaker must understand the audience and find ways to be engaging and interesting, as well as capable to adapting to circumstances that may arise in such forums. Public speaking is a skill that must be developed and constantly improved, which has led to an increased emphasis in university curriculum, as well as third-party training and development programs such as Toastmasters.

Many individuals pursuing engineering or other degrees related to the transportation industry have skills deficits in this area or may be unaware of the importance of having good public speaking skills. These skills are important in a variety of contexts, including job interviews, public meetings, and presentations to secure new projects. Being able to effectively deliver a message to an audience, small or large, is critical to becoming a successful transportation professional.

2.3 Technical writing
In addition to oral presentation, effective technical writing is also a skill that is often largely underdeveloped among junior-level professionals. While academic institutions have made significant strides to enhance the degree to which technical writing has been integrated into undergraduate curricula, this is challenging as large reports are generally prepared in small teams, making it difficult to provide effective one-one-one instruction or to ensure that all students are effectively engaged in the process. Summer co-op and internship programs are often not focused on technical writing either and a lot of these skills continue to be learned on the job.

As with oral communication, the information that transportation professionals convey is often complex, and the goal is to present it in a format that is easy to read and understand. A good technical writer needs strong writing and communication skills. Being able to effectively share information in writing to others, both inside and outside of the industry, is imperative. Transportation professionals are faced on a daily basis with writing assignments ranging from technical reports to document study findings to technical proposals to obtain new contracts/work from new clients. An area of particular concern is proposal writing, which is a very nuanced skill that employees typically learn through several years in a professional work environment.

2.4 Teamwork
The ability to work well with other people from different backgrounds is essential, and this is becoming a particular issue as transportation continues to become a more multidisciplinary field and the nature of the profession continues to evolve. Teamwork is an essential quality as it leads to better relationships with colleagues, often resulting in greater collaboration and innovation. Professionals are tasked with serving in a variety of roles where they must act as either a leader or an effective follower of collaborator, depending on context.
Throughout most of an academic program, the focus is predominantly on individual performance as evaluation is primarily done on the basis of performance on standard assignments and exams. Teamwork typically becomes more important in upper-level courses, particularly senior-level capstone design courses. However, when graduates enter the workforce, they find a starkly contrasting environment. Teamwork becomes an essential skill to have in order to participate in transportation projects that can be massive in scale. Most successful professionals cannot recall any work they have done throughout their career that did not involve teamwork.

2.5 Ethics
According to the National Society of Professional Engineers, “Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct.” Ethical behavior is a core value of the transportation profession. The interaction a transportation product has with the general public makes it imperative to have all professionals involved have high regards for ethics. In general, the topic of ethics is covered to some degree in university programs, as well as on licensing exams. Many of these case studies tend to be clear as to what the appropriate ethical decisions would entail. However, the work environment presents a myriad of challenges that introduce ambiguity and make decisions more uncertain.

2.6 Project management
Project management is the application of knowledge, processes, skills, tools, and techniques to project activities to meet the project objectives. The primary challenge of project management is to achieve the project goals within the primary constraints including scope, budget, schedule and quality. In academic programs and entry-level positions, professionals often focus on small, distinct aspects of an overall project, making it challenging to understand the big picture elements that are critical to success of a project and a team.

The ability to effectively manage these numerous, interrelated smaller elements of a much larger project is an indispensable skill, particularly for professionals wanting to move ahead in their career. The primary purpose of project management is to effectively plan, execute and control all aspects in consideration of the bottom-line objectives of a project. Most professionals rely on key tools for managing a project to ensure that each task is completed on time, on budget, and to balance staff workload for optimal time management. Transportation projects tend to be complex and multi-faceted, in need of effective planning, organization and monitoring. The ideal goal of effective project management and the role of project manager work is to reach the expected outcome of a project on time and within budget.

2.7 Leadership
Leadership, in and of itself, is not one skill but the blending and integration of a variety of skills. By its very nature, leading people is about successfully interacting with them and convincing them to follow. This makes leadership a key soft skill for STEM professionals who intend to make a difference. The ability to truly inspire and instill confidence is at the heart of all good leadership. Some people have natural leadership abilities, but good management skills can be sharpened with the right training and development. Transportation professionals need leadership skills not only if they are interested in a leadership position within an organization. As mentioned before, most of the work done in this industry is done in teams and having sharp leadership skill will assist in any group setting. Having the ability to inspire and instill confidence will get the best results from any group session.
3. SURVEY OF TRANSPORTATION PROFESSIONALS

After identifying a short-list of important soft skills that could be enhanced through programmatic efforts by ITE and other organizations, broader insights were solicited from a diverse range of transportation professionals. A draft survey was developed over several months in early 2018. The purpose of this survey was to gain feedback from the transportation industry as to gaps, as well as opportunity areas for improvement, among soft skills among early-career transportation professionals, particularly those in the first five years of their career.

The survey was designed for implementation in a web-based format and survey dissemination began in May 2018 using SurveyMonkey. Participation was solicited through a variety of venues, which included the ITE All Member Forum, the Spotlight e-newsletter, and through various listservs from ITE districts, sections, and other partner organizations.

The survey, a complete version of which can be found in the Appendix, sought input into the soft skill areas described previously. Within each of these areas, respondents were asked to provide a rating on a five-point Likert scale as to:

- How important each of the skills are to early-career transportation professionals.
- How prepared early-career transportation professionals are with respect to these skills.
- How valuable training/outreach programs in these areas would be for early-career professionals in the transportation industry.

Respondents were also asked whether their organizations provided any training opportunities for early-career professionals in these same areas, whether internally or through a third-party. The survey also solicited details as to any courses or training programs that are recommended for early-career transportation professionals to improve their skills in any of these skill areas. In addition to these content-focused questions, the survey also included a series of questions to distinguish characteristics of the respondents in terms of their personal background (age, position title, degrees/licenses/certifications), their company (public vs. private, number of employees, geographic location), as well as whether their employer encouraged participation in professional societies (e.g., ITE, ASCE), community service/volunteer activities, or if the employer engaged staff in team building exercises.

While a comprehensive summary of survey results is provided in the appendix, the following are a few highlights:

- There were total of 159 respondents, the majority of whom were mid-career (31%) and senior-level (30%) staff.
- There was good diversity in terms of public vs. private organizations of different sizes, with the most responses coming from private firms with more than 100 employees.
- 82% of the respondents had BS Degrees, 64% had PE license, 54% had graduate degrees, and 30% had PTOE certification.
- The majority of respondents were between ages 30-39 (37%) and 40-49 (22%).
- There was geographical coverage across all ITE districts, with the largest number of responses coming from the Western (18%) and Mid-Western (16%) districts.
Figure 1 provides a summary of how valuable survey respondents found each of the ten skills to be on a five-point scale. In general, the most important areas were shown to be teamwork, ethics, and various forms of technical communication (face-to-face, e-mail, and report writing). Interestingly, many of the more nuanced skills such as client interaction, leadership, and project management were not rated as highly. This is likely reflective, in part, to the fact that such skills are often acquired through on-the-job experience. Likewise, proposal writing was found to be the least important skill and this task would generally be expected of more senior staff members.

![Figure 1](image)

**FIGURE 1 Importance of Skills to Early-Career Transportation Professionals.**

Figure 2 provides a similar summary (on a 5-pt scale) of how well employees felt early-career transportation professionals were prepared in each of these skill areas. In general, these ratings were very consistent with the importance of these skill areas as evidenced by a correlation coefficient of 0.83 (p-value < 0.01). This suggests that the educational and work experiences of the entry-level transportation workforce is well aligned with industry expectations, at least in terms of the relative importance of these skill areas.

However, it is important to acknowledge that the general level of preparedness was found to be relatively low, with only four of the ten skills having an average rating above 3.0. This suggests that significant improvements can be made in most of these areas. Scores were particularly low in some of the more nuanced areas of professional practice, such as project management, client interaction, and proposal writing.
Figure 3 provides a summary of how valuable respondents felt training programs would be within each of these ten skill areas. Interestingly, these ratings provided very weak correlation with the importance of the skill areas ($r = 0.07$). This is likely reflective of the manner in which these skills are generally acquired. For example, while ethics was considered to be very important, this type of “skill” is largely reflective of the beliefs, attitudes, and other intangible characteristics of the individual employees. In contrast, while public speaking was found to be of moderate importance as the seventh most important skill, it was found to be the most valuable area in which training could be developed. The results from Figure 3 suggest that perceptions of value are generally aligned with preparedness, with training being perceived as less important in areas where employees were well prepared ($r = -0.38$).

Lastly, Figure 4 shows a side-by-side comparison of how respondents viewed the importance, the preparedness of early-career professionals, and the value of potential training and outreach programs in each of these ten skill areas. From a practical standpoint, the areas that are in greatest need of training generally include those with some combination of high importance, low levels of preparedness, and high value in training delivery. The data from Figure 4 suggest virtually all of the ten skill areas warrant consideration, though the skills of particular interest include report writing, client interaction, and various forms of written and oral communication.

Beyond the ten primary areas noted previously, survey respondents also highlighted several additional soft skills that warrant additional efforts, including: politicking, mentoring, phone communication, empathy, and conflict resolution. Ultimately, based on the collective feedback, multi-faceted programs that can address each of these areas appear to have strong support from the transportation industry.
FIGURE 3  Value in Development of Training Specific to Skill Areas.

FIGURE 4  Summary of Importance, Preparedness, and Value of Training by Skill Area.
4. CURRENT EFFORTS ACROSS THE TRANSPORTATION INDUSTRY

In an effort to better define how the Institute of Transportation Engineers (ITE) can help to fill the soft skills gap that are evident in the survey respondents’ responses, it is important to consider what is currently available for the early career professional. While it is apparent there are many avenues to continue one’s education on soft skills, this project involved primarily a cursory review of what is being offered through institutions, such as universities, employers, professional societies, and employers. It would be beneficial for future efforts to further investigate opportunities to leverage existing programs or potential partnering opportunities.

4.1 University Setting
As noted previously, significant efforts have examined the degree to which existing academic programs address technical skills that are salient to transportation-related careers (Hoel, 1982; Khisty, 1986; Turochy, 2006; Turochy et al., 2013; Hurwitz et al., 2016). Nearly all of the undergraduate civil engineering programs in the country have at least one required course in transportation engineering, with several having two such courses. Soft skills are generally addressed implicitly as a part of these courses, where requirements may include design projects, technical presentations, or other assignments designed to mirror expectations of a professional work environment. However, university curricula are usually limited in terms of an explicit focus on soft skills. Accreditation requires universities to offer courses on technical writing and speaking, though these courses are often very general in nature. Some universities also offer courses on topics such as professional practice, which do cover a broad range of skills including some of the soft skills highlighted as a part of this study.

4.2 Professional Societies
There is a myriad of engineering and professional societies in the current landscape. In order to better define the availability for soft skills training for early career transportation professionals, this initial review focused narrowly on professional organizations that would have the largest share of transportation professionals, outside of ITE, such as the American Society of Civil Engineers (ASCE), the Institute of Electrical and Electronics Engineers (IEEE), ITS America, and the American Planning Association (APA). This review showed that these professional organizations generally offering training and certification programs, with a primary focus on technical skills. However, ASCE does offer an on-demand webinar package comprised of three courses:

- Improving Project Communication: Within and Outside of the Project Team
- Speaking: How to Prepare and Deliver a Convincing Presentation
- Writing: How to Engage and Convince Your Readers

4.3 Employers
As with professional organizations, there are too many employers, on both the public and the private side to provide an in-depth look at what each employer is doing. Instead, an internal review was conducted of the organizations that the team members are associated with.

Arcadis, a global design and consultancy firm, based out of the Netherlands, has training programs for all levels of employees across their organization. While facets of these training opportunities contain coverage of soft skills, namely project management, there is one opportunity that is open
to all early career professionals, which, while it does not focus specifically on soft skills development, it does provide the opportunity to hone essential soft skills, such as teamwork and leadership. Arcadis’ Global Shapers program is open to all early career professionals, with less than five years of work experience. It is open to employees from all four business lines. Infrastructure, Water, Environment, and Buildings, so it is not a program solely for transportation focused professionals. The program brings together 100 employees from across the globe and has three essential building blocks: 1) Learning more about Arcadis, 2) a strategic challenge that changes on a yearly basis, and 3) personal leadership, where the employees take ownership of personal development and well-being.

Gannett Fleming offers various in-house training opportunities for employees at different stages of their career on topic including project management, and leadership. There is a Toastmasters club in the Gannett Fleming corporate office in Harrisburg, PA. In addition, all Gannett Fleming employees are invited to become part of the Future Generations of Gannett Fleming, no matter where they are in their careers. The mission of this initiative is to energize, engage, and promote the future generations of our firm.

Kimley-Horn provides a series of technical and leadership training opportunities to current employees in areas such as marketing, production, administration, project management, career development, etc.

The Port Authority of New York and New Jersey have two robust one-year (14-15 Module) Leadership Training program for Emerging Leaders and Executive Leader.

The City of Calgary has a number of leadership development programs (Learning for Municipal Excellence, Emerging Leader, Supervisory, Manager), but these are primarily aimed at those entering leadership positions, not early professionals. There is an Engineer in Training Rotation Program to give new graduates a variety of experience prior to getting their Professional Engineer designation, but no formal training program.

4.4 FHWA Center for Transportation Workforce Development
The Federal Highway Administration (FHWA) Center for Transportation Workforce Development coordinates a series of programs aimed at improving transportation workforce development across various disciplines. These programs are largely focused on technical skills, including on-the-job training and apprenticeship programs, as well as initiatives focused on the construction industry. While there are not currently programs that are soft skill focused, this appears to provide an avenue for potential integration of non-technical content. In particular, there are five Regional Surface Transportation Workforce Development Centers. These centers focus on region-specific concerns and have capacity for providing training, providing a number of partnership opportunities.

4.5. ITE Student Chapters
Originating in the Western District of ITE, Student Leadership Summits have been held across the United States to promote leadership and professional development. These summits are planned by the student chapters, which provides those developing and planning the summit an opportunity for the development of leadership, teamwork, and organizational skills. The summits allow students to connect with transportation industry professionals and focus on both on the
development of technical expertise and soft skills, such as leadership, preparing the participant for entry into and making an impact in their role as an early career transportation professional.

4.6. Leadership ITE
LeadershipITE is a program that was launched in 2014 with the intent of identifying, developing, and engaging future leaders in the transportation industry. The program is comprised of a series of workshops, conferences, team projects, webinars, and other activities aimed at addressing the specific challenges and opportunities facing both the transportation industry and ITE.

4.6 Other Training Programs and Courses
Beyond the initiatives noted previously, several additional courses and training programs were identified as a part of the transportation industry survey. A short summary of some of these opportunities is provided below:

- Toastmasters International is an organization through which members are able to improve their public speaking and leadership clubs through a club environment. Members have the opportunity to give speeches, provide feedback, and interact with others in a community environment. ([https://www.toastmasters.org/](https://www.toastmasters.org/))
- SkillPath provides training in the areas of leadership and innovation for companies and businesses. This includes live training and webinars on topics that include professional development/communication, project and time management, business writing, and social media. ([https://skillpath.com/](https://skillpath.com/))
- Dale Carnegie provides a series of professional development and training opportunities, which include people skills, presentation, leadership, and organizational development training. ([https://www.dalecarnegie.com/en](https://www.dalecarnegie.com/en))
- Coursera partners with universities and other organizations to offer a series of online courses across various areas, such as public speaking, leadership, and teamwork. ([https://www.coursera.org/](https://www.coursera.org/))
- Professional Services Management Journal (PSMJ) provides educational training in the domain of architecture and engineering business management. Training programs and e-Learning are available in project management, strategic planning, business development, and leadership development. ([https://www.psmj.com/](https://www.psmj.com/))

5. ITE’S ROLE

Young professionals entering the transportation workforce typically have a strong technical background resulting from a rigorous academic program in an area such as engineering, computer science, planning, or logistics. Successful completion of a degree plan with 120+ hours of course material is often supplemented through a series of comprehensive examinations, qualifying work experience, and certification or professional licensure. However, the transportation industry does not have a formal means to scrutinize the additional skills, beyond the fundamental technical foundation, that young professionals need to flourish in today’s engineering workforce. In order for a young professional to move up the corporate ladder, they must demonstrate not only a mastery of technical tools, but also the complementary non-technical skills and other intangible characteristics necessary for career success. These “soft” skills are consistently demonstrated by successful group leaders, project managers, and chief executive officers.
Traditionally, it takes years to develop a set of soft skills that, in combination with the proper technical foundation, can distinguish potential industry leaders among project engineers. This report summarizes the extant research literature and leverages the results of a national transportation industry survey to shed light on the importance of how the industry values soft skills and how, as an industry, there is not a sufficient level of training and engagement for professionals at an early stage in their careers.

ITE can position itself to fill this void through the development and implementation of various policies and programs. This will allow ITE to facilitate improvements to soft skills among transportation professionals, which would result in benefits for these individuals and for the profession more broadly, enhancing the abilities of these professionals to work together effectively in multidisciplinary teams, overcome long-standing issues related to technical and interpersonal communication, and become improved and more persuasive communicators. With these objectives in mind, the principal recommendations are as follows:

- Develop a young professional training program targeted toward early-career (i.e., first five years) professionals. This program could be integrated with the successful models that have been developed for university studies through the ITE Student Leadership Summits and mid-career professionals in the form of LeadershipITE. Such a program would address several important concerns, including a general lack of engagement as recent graduates transition into the workforce. The program could also capitalize on synergies with the other ITE programs, as well as emerging pedagogical methods that would minimize the costs of program implementation such as flipped/hybrid course designs and other means for online instruction.

- Create and foster partnerships with partner organizations, including both technically-focused professional societies such as ASCE and ITS America, as well as organizations focused explicitly on soft skill development such as Toastmasters. This could lead to the development of smaller workshops, modules, and webinars that would target these young professionals and also provide appeal to the broader transportation workforce.

- Integrate soft skill development into ITE district- and section-level meetings. This is well aligned with the ongoing ONE ITE initiative, which aims to develop closer and more consistent coordination within and across District-Section-Chapter (D-S-C) leadership. This would allow for the consistent delivery of soft skill related training and outreach programs and facilitate collaboration and information sharing that leverage smaller-scale initiatives that have proven successful in specific districts and sections.

Leadership of these efforts may fall under the purview of various stakeholders both internal and external to ITE. Internally, the ITE Education Council is well positioned to spearhead support among academic institutions, students, and faculty. However, development and implementation of a soft skills focused program will also require input and active participation of public agencies, private consulting firms, and the employees thereof. To this end, a multidisciplinary task force may represent an appropriate next step toward the implementation of strategic programs to mitigate the existing soft skills gap among early-career transportation professionals.
**Catalina Echeverri, PMP** has a bachelor’s degree in industrial engineering and a master’s degree in civil engineering from the University of South Florida. She is a transportation operations project manager for Gannett Fleming in Miami, FL, with more than 13 years of experience in intelligent transportation systems (ITS), advanced traffic management systems (ATMS), signalization design, and access management. She was named one of ENR’s Southeast 2018 Top 20 under 40. Catalina is currently the Women Transportation Seminar (WTS) South Florida chapter Transportation YOU chair, co-chair of the WTS South Florida chapter Mentoring Program, and vice chair of the FSITE Florida Transportation Planning Council.

**Daniel B. Helms, P.E., PTOE**, is currently a senior transportation engineer with Arcadis U.S., Inc. Previously, he served as traffic safety engineering manager with the Mississippi Department of Transportation, as traffic engineer for Sain Associates in Birmingham, Alabama, a civil engineer for the Village of Carol Stream (Illinois), and an associate transportation engineer for Parsons Transportation Group, in their Chicago office. He graduated from Louisiana State University with a bachelor’s degree in civil engineering and a masters of engineering from Texas A&M University. He is the current President of the Deep South Section of ITE, serving as Secretary/Treasurer in 2016. Daniel lives with a rambunctious rescue dog, Brooks, in Ascension Parish, Louisiana.

**Farukh Ijaz, P.E.** is an on-site traffic engineer from Kimley-Horn with the Port Authority of NY & NJ. He has been involved in the planning, design, construction, and operations of multi-million dollar projects that represent critical links within the NY/NJ regional transportation network. Farukh graduated from University of Engineering and Technology, Lahore with a bachelor of science in civil engineering and University of Illinois at Chicago with a master’s degree in transportation engineering. He is a member of ITE, the American Society of Civil Engineers (ASCE), and the Project Management Institute (PMI), as well as a Professional Engineer in the states of New Jersey and Arizona.

**Julio Ramos, P.E., PTOE** is a transportation project manager for Civil Engineering Consultants in San Antonio, Texas. He is a 2005 graduate from the University of Texas at San Antonio. Julio’s experience includes project management and design of numerous roadway and enhancement projects throughout South Texas. In 2015, he received the Texas District of ITE “Younger Member of the Year” Award and was named a member of the 2016 ITE Rising Star Class. He served as the STITE Section 2016 President and as Secretary/Treasurer in 2014. He also served as President of the Society of Hispanic Professional Engineers San Antonio Chapter. In his personal life, he enjoys spending time with his wife and two children.
Peter Savolainen, Ph.D. is an MSU Foundation Professor in the Department of Civil and Environmental Engineering at Michigan State University. He teaches courses in transportation engineering, highway design, traffic safety, and statistical and econometric methods, in addition to serving as an ITE student chapter faculty adviser. His research program is focused on improving our understanding of road user behavior and how this behavior is influenced by the transportation infrastructure. Peter has a bachelor of science degree from Michigan Technological University, as well as master of science and doctoral degrees from Purdue University. His passions include sports, craft beer, and spending time with his wife and two children.

Ryan Vanderputten, M.Eng, P.Eng. is the Director of Transportation Planning with The City of Calgary. He has been a member of the Canadian Institute of Transportation Engineers (CITE) since 1999. He served as President of the Southern Alberta Section in 2009. He is also a member of the 2017 class of LeadershipITE. Over his nearly two-decade-long engineering career, he has worked in both the public and private sectors, in Ontario, British Columbia, and Alberta. He has a Bachelors degree in Civil Engineering from the University of Waterloo, a Masters degree in Transportation Engineering from the University of Calgary, and a Masters Certificate in Municipal Leadership from the Schulich School of Business from York University.

Alyssa A. Reynolds Rodriguez, P.E., PTOE works for the City of Henderson, Nevada as the city traffic engineer. Her background covers a wide variety of transportation engineering and planning projects including traffic impact studies, traffic signal design, travel demand modeling, asset management systems, safe routes to school, and GIS applications. Her civil engineering bachelor’s and master’s degrees are from Montana State University. Alyssa has been a member of ITE since 1998 and has served in leadership roles with the Western District, Intermountain Section, Nevada Chapter, and Montana State University Student Chapter. Alyssa is recently married to her husband Kenny, and together they enjoy travel, ATV’s and golf.
REFERENCES


ITE Survey on Soft Skills Among Early-Career Transportation Professionals

The purpose of this survey is to gain feedback from the transportation industry as to gaps, and opportunity areas for improvement, in soft skills among early-career transportation professionals (particularly those in the first five years of their career). The results of this survey will aid in the development of recommendations for education, training, and outreach efforts aimed at addressing these skills gaps. The survey should take 5-10 minutes to complete and your responses will be kept confidential. Your input and feedback on these critical issues would be greatly appreciated!

1. On a scale from 1 (not at all important) to 5 (extremely important), please rate how important each of the following skills are to early-career transportation professionals.

<table>
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<tr>
<th>Skill</th>
<th>1-Not at all important</th>
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<th>4</th>
<th>5 - Extremely important</th>
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2. Please note if there are any additional soft skills you feel are important that are not listed here.
3. On a scale from 1 (not at all prepared) to 5 (extremely well prepared), please rate how prepared early-career transportation professionals are with respect to the following skills.

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<th>3</th>
<th>4</th>
<th>5-Extremely well prepared</th>
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4. On a scale from 1 (not valuable) to 5 (extremely valuable), please rate how valuable training/outreach programs in the following areas would be for early-career professionals in the transportation industry.

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<tr>
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<th>5-Extremely valuable</th>
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5. Does your organization currently provide any training opportunities (either in-house or through a third-party) for early-career professionals in the following areas? (Check all that apply.)

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<th>Yes, formal in-house training</th>
<th>Yes, informal in-house training</th>
<th>Yes, formal training by a third-party</th>
<th>No</th>
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6. Please provide details of any courses or training programs (e.g., Toastmasters International) you would recommend for early-career transportation professionals to improve their skills in any of the aforementioned areas.


7. Does your organization encourage you to participate in professional societies (e.g., ITE, ASCE)?

○ Yes
○ No
○ Unsure

8. Does your organization engage staff in team building exercises?

○ Yes
○ No
○ Unsure
9. Which of the following titles most closely describes your current position.

- Engineer-in-Training (EIT)/Engineering Intern
- Assistant Engineer/Junior Engineer/Staff Engineer/Instructor
- Civil Engineer/Associate Engineer/Project Engineer/Assistant Professor
- Principal Engineer/District Engineer/Engineering Manager/Professor
- Director/City or County Engineer/Vice President/Department Head
- Bureau Engineer/Director of Public Works/President/Dean

10. Does your organization encourage you to engage in community service or volunteer activities?

- Yes
- No
- Unsure

11. What type of company/organization do you work for?

- Public (25 or fewer employees)
- Public (26-100 employees)
- Public (101-1000 employees)
- Public (more than 1000 employees)
- Private (25 or fewer employees)
- Private (26-100 employees)
- Private (101-1000 employees)
- Private (more than 1000 employees)
- Retired
- Not Currently Employed

12. Indicate which of the following degrees, licenses, and certifications you currently hold or have completed. (Check all that apply.)

- Bachelor of Science (B.S) Degree
- Master of Science (M.S) Degree
- Doctor of Philosophy (Ph.D) Degree
- Engineer in Training (EIT)
- Professional Engineer (PE)
- Professional Traffic Operations Engineer (PTOE)
- Professional Transportation Planner (PTP)
- Project Management Professional (PMP)
- American Institute of Certified Planners (AICP) Certification
- Other (please specify)
13. What is your age?
- 20 or younger
- 21-29
- 30-39
- 40-49
- 50-59
- 60 or older

14. Which ITE District are you located in?
- 1 Northeastern (CT, MA, ME, NH, NJ, NY, RI, VT)
- 2 Mid-Colonial (DE, MD, PA, WV)
- 3 Great Lakes (IN, MI, OH)
- 4 Midwestern (AR, IA, IL, KS, MN, MO, NE, ND, OK, SD, WI)
- 5 Southern (AL, GA, KY, LA, MS, NC, SC, TN, VA)
- 6 Western (AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, WY)
- 7 Canadian
- 8 International
- 9 Texas
- 10 Florida

15. Contact information (optional)
Name

Company

Email Address
Indicate which of the following degrees, licenses, and certifications you currently hold or have completed:

- Bachelor of Science (BS) Degree
- Master of Science (MS) Degree
- Doctor of Philosophy (PhD) Degree
- Engineer in Training (EIT)
- Professional Engineer (PE)
- Professional Traffic Operations Engineer (PTOE)
- Professional Transportation Planner (PTP)
- Project Management Professional (PMP)
- American Institute of Certified Planners (ACIP) Certification
- Other (please specify)

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Age:

- 20 or younger
- 21-29
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