NET-STEM Workforce Project: Understanding the hiring decisions of STEM employers of Northeast Tennessee

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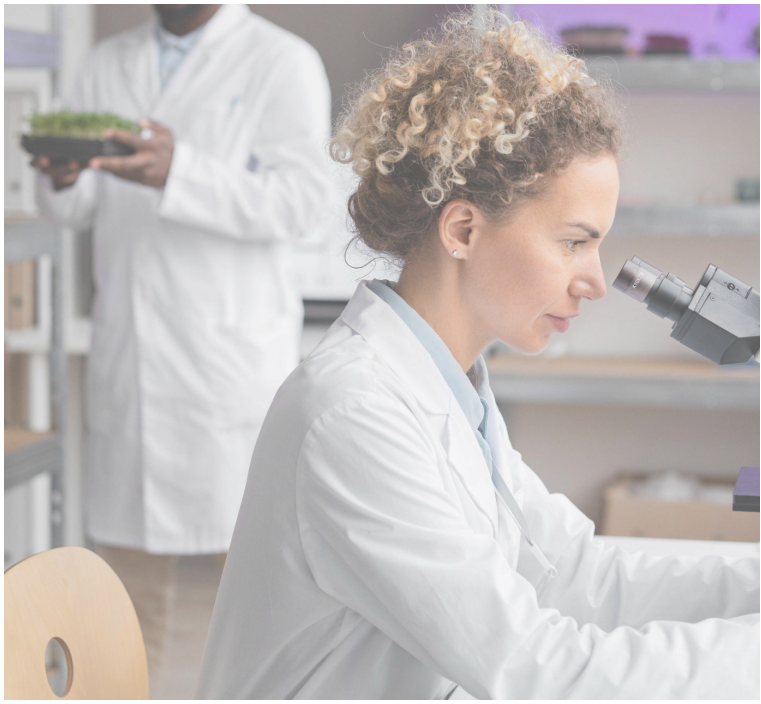

CENTER of EXCELLENCE in STEM EDUCATION
EAST TENNESSEE STATE UNIVERSITY

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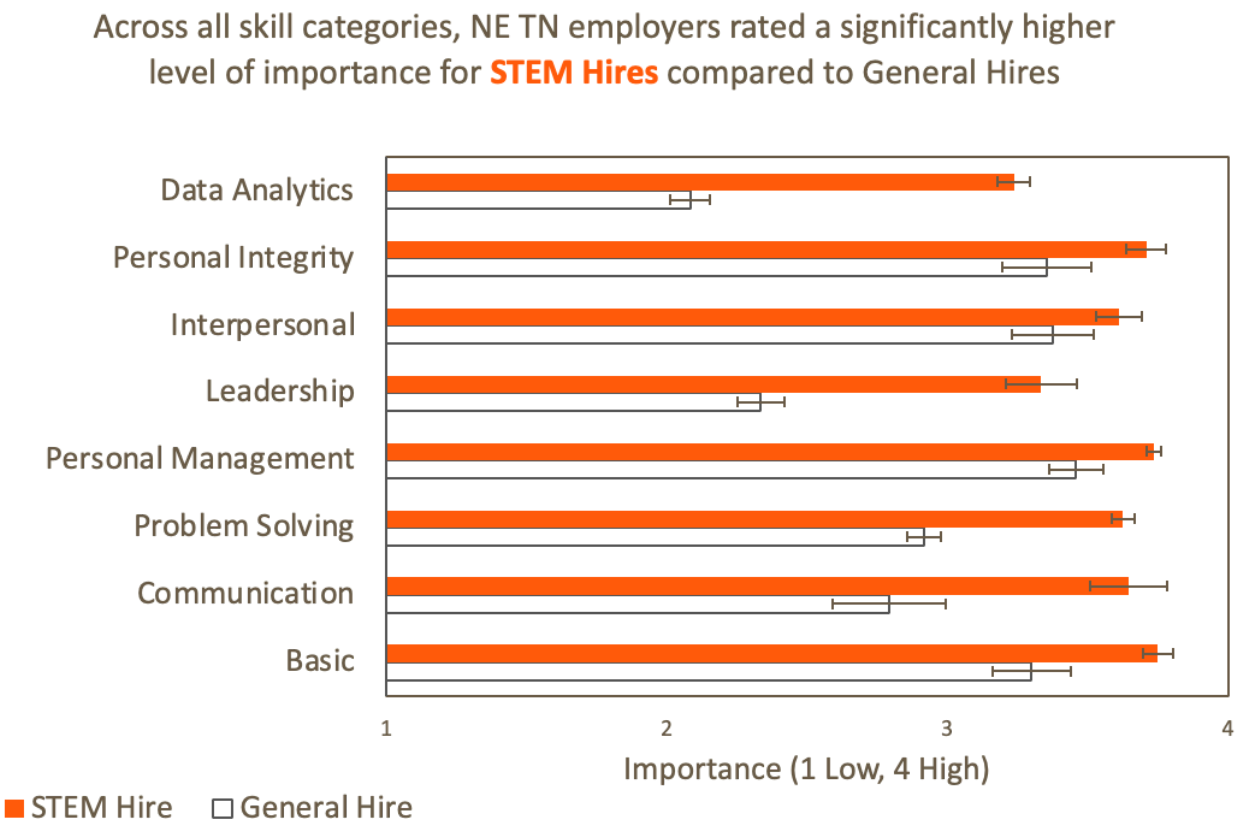
Executive Summary

The North East Tennessee STEM (NET-STEM) Workforce project aims to understand the skills, abilities, and competencies that local Northeast Tennessee STEM businesses are seeking in new entry-level employees in STEM. By investigating the local STEM workforce needs, educators and public educational institutions can better prepare prospective STEM employees in their pursuit of STEM careers. **The NET-STEM Workforce survey revealed that NE TN employers often rated a significantly higher level of importance for STEM Hires for 3 specific skills, namely data analytics and assessment, leadership, and communication.** The 5 other skills measured had comparable ratings of importance between STEM and General Hires, though many participants indicated a slightly higher rating for STEM Hires. In addition, employers are interested in partnering more with educational sectors, including PK-12th grade and higher education. Current work is in progress to facilitate more robust partnerships between PK-12 / higher education and industry, to develop opportunities for meaningful student engagement towards solving real company challenges.



Introduction

The gap between STEM (Science, Technology, Engineering, and Mathematics) education and the STEM workforce remains a significant challenge in today's rapidly evolving job market. While STEM education has made great strides in preparing students with foundational knowledge and technical skills, it often falls short in equipping them with the practical, industry-specific expertise demanded by employers. This discrepancy can be attributed to several factors, including outdated curriculum, a lack of alignment between educational institutions and industry needs, and the rapid pace of technological advancements that render some educational content obsolete. As a result, the transition from education to the workforce can be a daunting task for many STEM graduates, highlighting the need for more robust partnerships between academia and industry to bridge this divide and ensure a more seamless integration of STEM talent into the workforce.

Our project objectives were to understand the skills, abilities, and competencies that local STEM businesses are seeking in new entry-level employees in STEM areas, considering all levels of education in Northeast Tennessee (NE TN). Specifically, this project hoped to gather data to inform K-12 school systems and institutions of higher education (IHEs) of what STEM employers want and need in their potential STEM Hires, and how well that matches with what K-12 and IHEs (including ETSU) are providing in curricula. The results of this survey will be used to improve the workforce pipeline by better preparing prospective employees in the public education system and higher education for work in NE TN STEM industries and businesses. Our region has many strengths as do the people who live here, and we want to encourage more students to pursue STEM careers in part by showing them the locally available employment opportunities.

Methods

Survey development and IRB

To address these objectives, the research team from East Tennessee State University's (ETSU) Center of Excellence in STEM Education (CESE) and Department of Biological

Sciences developed a survey adapting existing proficiencies surveys (Core Competencies for Public Health Professionals Tier 1) and STEM career standards (STEM Common Career Technical Core standards) into items to measure a total of 8 categories of skills, abilities, and competencies (see **Appendix** for the survey). These 8 categories included items related to basic skills, communication skills, problem-solving skills, personal management, leadership, interpersonal skills, personal integrity or ethics, and data analytics. Respondents would be asked to rate the importance of each skill set on a 4-point scale, 1 being not at all important and 4 being extremely important, for both STEM Hires and General Hires in their workplace. We also allowed an N/A option if respondents felt that skill/ability was not applicable. Other questions were asked about Organizational Professional Demographics such as company name, number of employees, and company address, as well as open-ended questions on the relationship between educational institutions and the workforce, and inquiry for further follow-up. Altogether, 27 questions/blocks of questions were developed. A copy of the survey can be found in the **Appendix**.

It was necessary to define certain terms within the survey to ensure the validity of participant responses. Within the survey, we defined an **entry-level job** as a job that is normally designed or designated for recent graduates of a given discipline and typically does not require prior experience in the field or profession. By **STEM businesses,** we mean those companies that employ people in fields related to Sciences, Technology, Engineering, and/or Math disciplines, including but not limited to advanced manufacturing, robotics, health sciences, data science, *etc.* (please see examples of STEM Hires and Non-STEM Hires in **Table 1** below). The survey was estimated to take 15-20 minutes for respondents to complete and included a lottery incentive (ten $50 Amazon gift cards) for completing the survey. Participant consent was established at the start of the survey under IRB #c0123.27e.

Table 1: List of examples of STEM and non-STEM Hires to provide respondents with clarification on survey items.

STEM Hire Examples	Non-STEM Hire Examples
Engineer	Executive aide
Chemist	Assembly line
Biologist	Manager
Environmental scientist	Human resources
Machine/robot repair	Custodian
Data analyst	Designer, artist (non-software)
Tech support	Customer support/call center staff
Programmer	Social media/communications specialist
Mechanic	
Medical professional	

Two rounds of draft surveys were shared with industry, non-profit, and education leaders for feedback on question types and verbiage in Fall 2022 and Spring 2023. This survey was then prepared for dissemination using the survey software Qualtrics.

Survey dissemination

Each participant was emailed an invitation to participate in the research that outlined the purpose of the study as well as the risks and benefits involved. The email included a link to our anonymous survey in Qualtrics. Once participants opened the link, they were presented a consent document in which additional information regarding the study was included in addition to an option to consent to participate or not. If participants selected yes, they were automatically directed to the survey; if they selected no, the session ended.

The research team compiled a list of STEM businesses through professional networks (Niswonger, First TN Development District, Southeastern Advanced Machine Tools Network (SEAMTN) and businesses available through the Chambers of Commerce of 10 counties (Carter, Cocke, Greene, Hancock, Hawkins, Johnson, Knox, Sullivan, Washington, Unicoi). Snowball sampling was also conducted, as researchers encouraged participants to pass on the survey within and outside their company or institution.

Results and Discussion

Fifteen participants from various sectors (**Table 2**) responded to our survey since June 2023. Responses represented multiple different departments/divisions of an institution or company (e.g., R&D, Management, Marketing), with employee numbers ranging from 5-600 employees. Respondents also indicated a range of years worked in the institution or company, which varied from 6 months to 39 years

Table 2: List of industry types of the STEM business or industry respondents from the survey.

Industry Type	Count	Percentage (n=15)
Education	2	13%
Manufacturing	4	27%
Professional and business services	1	7%
Research and development	3	20%
Equipment and machinery repairing	1	7%
Computer software development or Information and technology	1	7%
Other (Federal gov't, informal education, nonprofit)	3	20%

Quantitative survey data revealed that there are certain skills, abilities, and competencies employers look for in STEM Hires compared to a General Hire

Across all categories of questions, **respondents generally ranked all skills of higher importance for STEM Hires** (mean = 3.58) **than for General Hires** (mean = 2.96, **Figure 1**). This difference was statistically significant (paired two-tailed t-test: T = 5.09, df = 7, p = 0.001). However, the effect sizes of these ranking disparities varied by category with the differences being more pronounced in the areas of **Data Analytics, Communication, and Problem Solving** (e.g., **Figure 2**). In Personal Integrity, Personal Management, and

Interpersonal Skills the effect size was less pronounced (e.g., **Figure 3**). These consistent differences among categories are validating for the survey in that it shows that the respondents were specifically considering how the skills varied between STEM Hires and General Hires. Moreover, the more pronounced effect sizes in analytical skills and problem-solving fit with STEM job descriptions as we predicted. Interestingly, the increased importance for STEM Hires in the category of Leadership was also highly pronounced suggesting that STEM Hires are expected to be greater leadership roles in the companies.

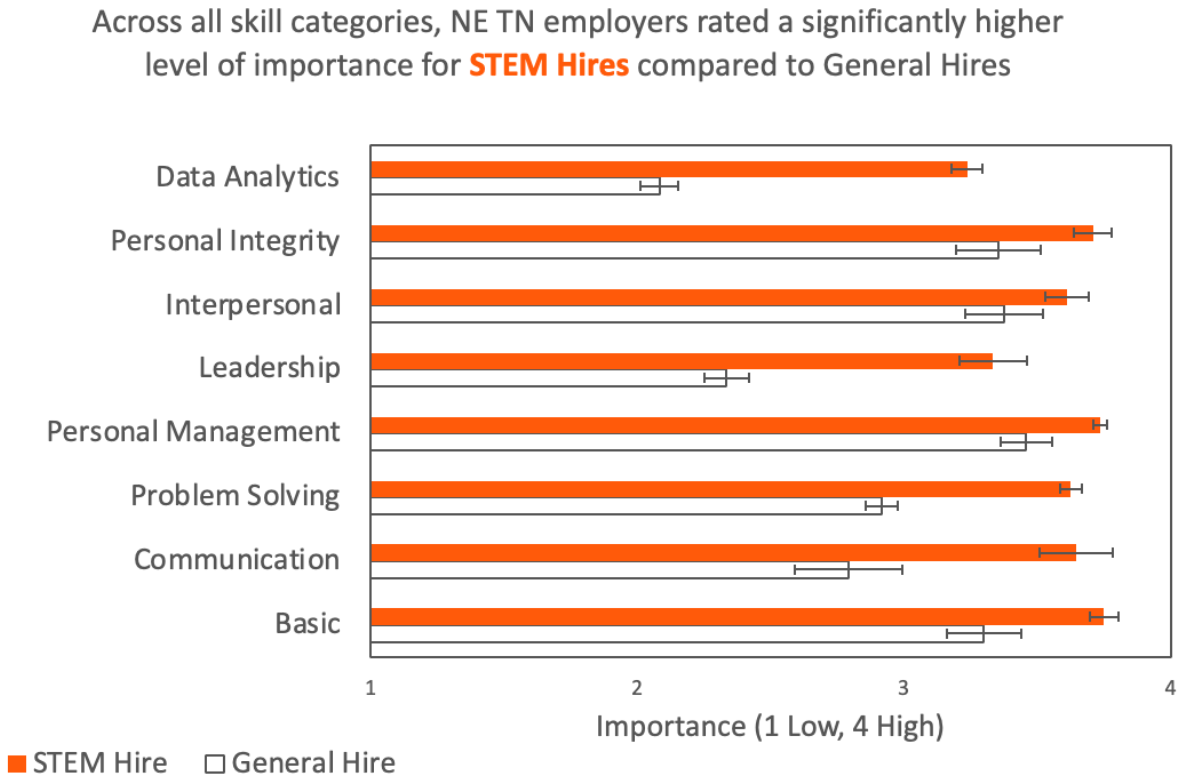


Figure 1: Average level of importance of the categories of skills, abilities, and competencies asked about in the survey. STEM Hires often had a higher rating of importance for industry leaders to see compared to General Hires.

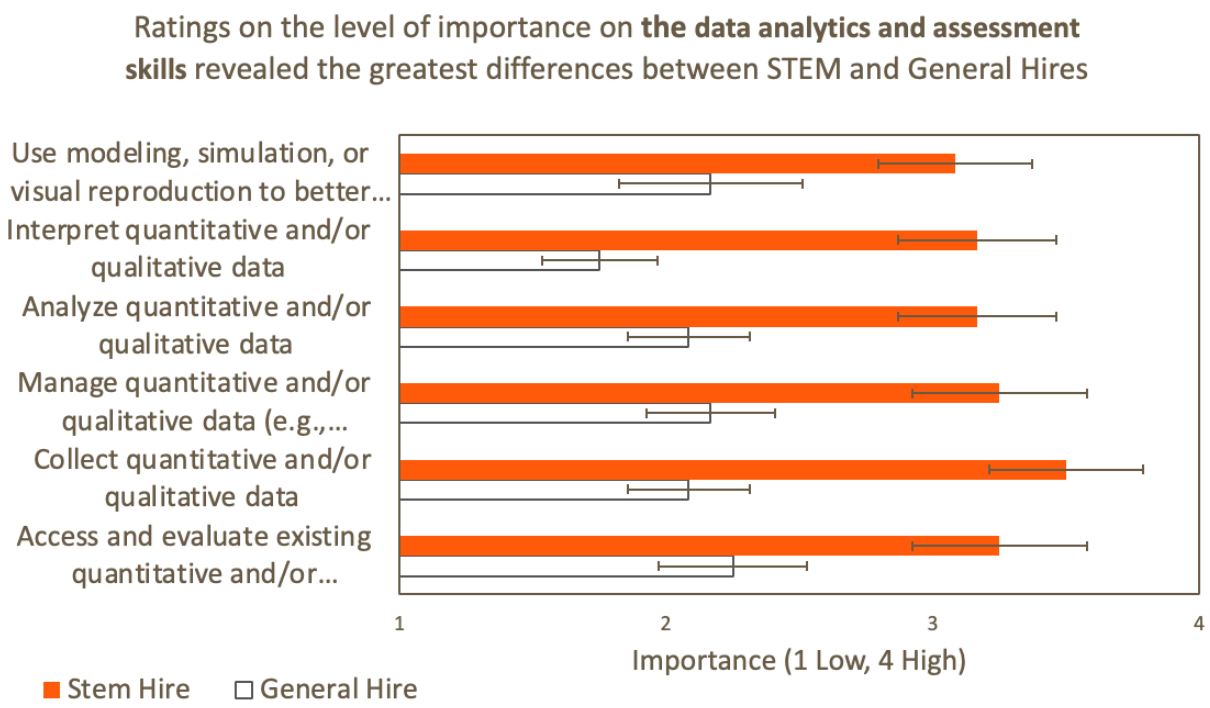


Figure 2: Average level of importance of the 6 questions specific to data analytics and assessment skills. STEM Hires had significantly higher ratings of importance for these skills compared to General Hires. Elements of Data Analytics and Assessment were ranked higher for STEM Hires (mean = 3.24) and for General Hires (mean = 2.08). This effect size was large (6.59), and statistically significant (paired two-tailed T-test: $T = 13.22$; $df = 35$, $p < 0.001$).

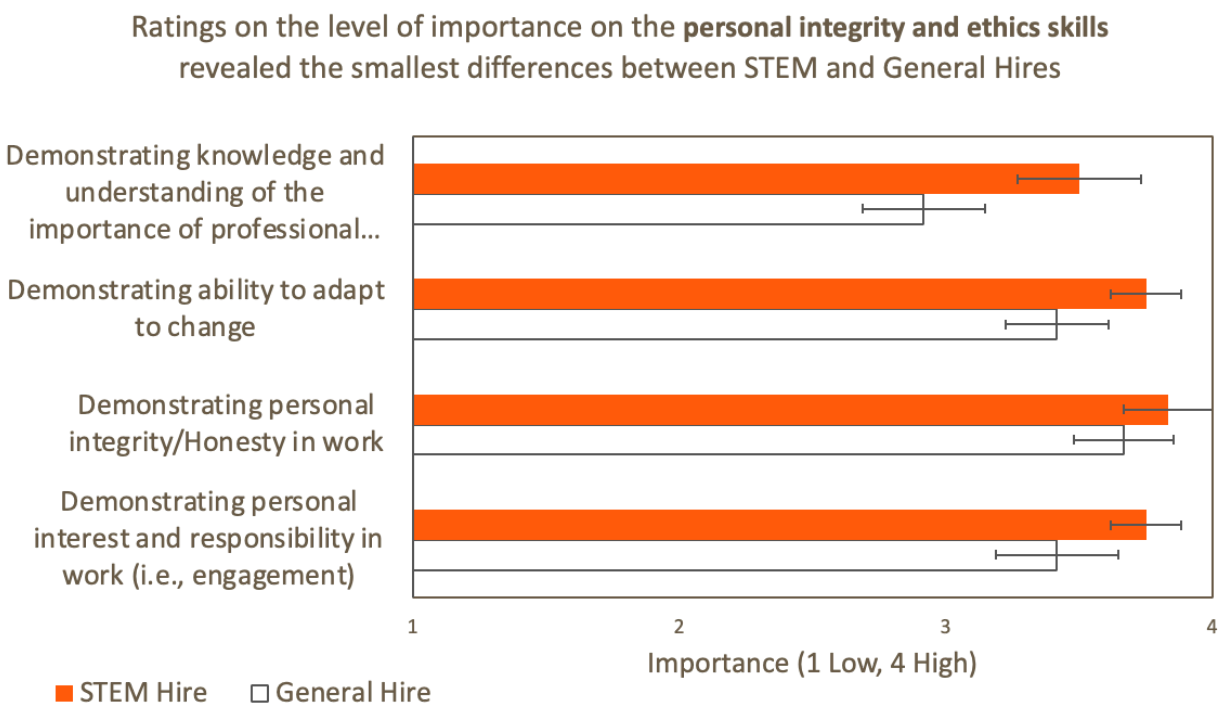


Figure 3: Average level of importance of the 4 questions specific to personal integrity and ethics attributes. STEM Hires and General Hires did not appear to have meaningful differences, though STEM Hires were rated slightly higher on average. Elements of Personal Integrity and Ethics were ranked highly both for STEM Hires (mean = 3.71) and for General Hires (mean = 3.35). Though the effect size was small (1.12), respondents did rank importance significantly higher for STEM Hires (paired two-tailed T-test: T = 4.12; df = 3, p = 0.02).

Respondents desired to see more collaborations or connections between education and industry through internship opportunities or co-op opportunities for students

When asked about the relationship between the workforce STEM industry and K-12 and higher education institutions, most respondents recognized the importance of such a collaboration and relationship (**Figure 4**). When asked about how education systems (both K-12 and institutions of higher education) can better prepare entry-level STEM workers, many respondents pointed to the help needed to facilitate internship programs, volunteer opportunities, hands-on experience, or work-based learning for students. As one respondent shared, these opportunities would allow for ***"some form of hands-on learning in a real-world environment"*** for students. Such connections between industry and

education systems could also be fostered through ***"facilitat[ing] guest speakers for classes and connections with local industry professionals"*** or ***"encourag[ing] visits to local industries and construction site visits."*** Any kind of exposure for students to have meaningful, productive connections with industry professionals, where both parties benefit from the interactions, seems to be the most sought-after by companies.

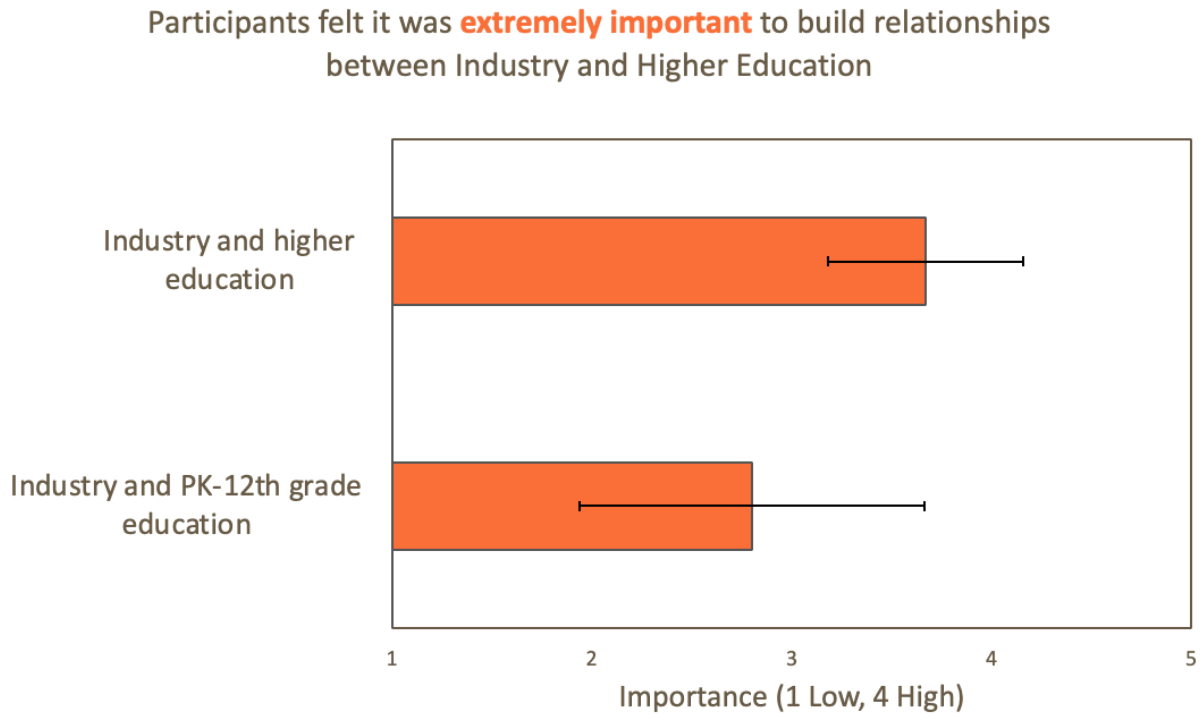


Figure 4: On a scale from 1 to 4, with 1 being not important and 4 being extremely important, participants felt it was important to build relationships between the STEM industry and K-12 and higher education.

Another theme that emerged in the open-ended responses was related to familiarity with specific software (e.g., Microsoft suite, C++, AutoCAD, Solidworks, Mastercam) or machinery equipment. It may be worthwhile to compile a list of such software or industry equipment for educators or faculty professional development content creators to consider incorporating in their curriculum or develop pedagogical resources around.

Lastly, when asked about other STEM-specific skills or experiences that they perceived to be important for prospective STEM employees, respondents pointed to soft skills that may not be directly taught, such as work ethic: ***"We can teach just about any technology but***

SOFT SKILLS are something…that is much harder." One respondent reflected, ***"How do you teach someone to be engaged, pull work towards themselves? To be a "good employee" with a solid work ethic."*** Such soft skills, which may not appear to be STEM-specific, are invaluable for these companies to see in their employees. The harder question to answer is how can educational systems support the development of such positive motivations and ethics.

Limitations and Challenges

This project faced one main challenge, which impacted the generalizability of our findings: low recruitment from participating industries. Despite our attempts to make the survey more accessible and palatable (e.g., trying to make a shorter survey, a lottery for monetary incentives, pushing back the survey deadline with email reminders), we were only able to collect 15 responses over 3 months (Feb-April 2023). With a low sample size, statistical power diminishes, thus limiting our ability to make generalizations about the local STEM workforce's needs and perceptions. Responses we did receive were often from a professional connection with one of the members of the research team, and rarely from "cold-emailing". Future dissemination of the survey requires a concerted recruitment plan that continues to leverage existing professional connections and potentially foster new ones.

Conclusions and Future Directions

The NET-STEM Workforce survey revealed that NE TN employers often rated a significantly higher level of importance for STEM Hires for 3 specific skills, namely data analytics and assessment, leadership, and communication. The 5 other skills measured had comparable ratings of importance between STEM and General Hires, though many participants indicated a slightly higher rating for STEM Hires. In addition, employers are interested in partnering more with educational sectors, including PK-12th grade and higher education. Although the sample size was small, the responses were surprisingly consistent, suggesting additional data should be collected.

Based on these results, three major efforts have been developed: 1) a STEM education workforce-focused Spring 2024 STEM Hub meeting, which includes state-level staff attending to provide advice; 2) teacher-company partnerships in NE TN program, pairing middle school teachers with a community employer, with plans to expand to

include elementary school teachers; and 3) regular Education-Workforce in NE TN Workgroup Meetings, where educators and industry leaders come together to break bread and discuss potential new partnership ideas. The team will collect data on the effectiveness of these programs to inform the next steps.

Outside those programmatic developments, additional funding opportunities (e.g., NSF) will be sought to collect additional data, possibly shortening the original survey to encourage more responses. We may invite a sample of respondents to participate in focus group interviews to understand better the needs of the NE TN STEM industry and the extent to which their needs match the education provided to STEM graduates. Lastly, new collaboration opportunities (e.g., CESE is partnering with ORAU STEM Accelerator) will also be sought and cultivated to extend our work to enhance partnerships between employers and educators across our region to enhance the quality of career-connected educational opportunities for all students.

Appendix

NET-STEM Works: Northeast Tennessee STEM Workforce Survey

Start of Block: Consent Form

Q1 **CONSENT FORM**

You are invited to participate in a study conducted by faculty at East Tennessee State University (ETSU) entitled, NET-STEM Works: The Northeast Tennessee STEM Workforce Survey Project. The purpose of the study is to identify what skills, abilities, and competencies employers in STEM fields are looking for when hiring. The information gained from this survey will help inform programming in K-12 school systems and institutes of higher education (IHEs) related to STEM education. Understanding how programming related to STEM aligns with workforce demands will assist in efforts to prepare future employees across STEM fields.

If you agree to participate in this study, you will be asked to complete an online survey. The survey should take between 15-20 minutes. Your participation in this survey is voluntary. You are free to withdraw at any time, without giving a reason for withdrawing. To participate you must be at least 18 years of age and physically in the US. Any material likely to identify you as an individual will remain confidential and will be kept in secure storage at all times for 5 years and will be destroyed thereafter. The information collected from this survey will be used solely concerning the above-stated purposes. The results of the survey and analyses may be published but all identifying information will be removed. You may inquire where the data were collected, to whom the information has been disclosed, and the purposes for which the information has been stored.

The survey may be completed on a work or personal electronic device, however, while necessary steps are being taken to protect your confidentiality in your survey responses, this confidentiality cannot be completely guaranteed, and if you are using a work device your participation in this study may be known to your employer and subject to workplace rules and policies. Information collected from the survey will be saved on a secure website (Qualtrics) and will not be stored on your device or be accessible to your colleagues.

Upon completion of this survey, you will be prompted to share your name and email

on a separate page for a chance to receive a $50 Amazon Gift Card. You will also be asked if you would like to be contacted for follow-up research.

If you choose not to participate in this research study, please exit the survey.

By clicking "next", you are consenting to participate in this study. If you have any research-related questions or problems, you may contact me, Dr. Thomas C. Jones, at jonestc@etsu.edu. This research is being overseen by an Institutional Review Board (IRB). An IRB is a group of people who independently reviews research studies. You may also contact the ETSU IRB at 423-439-6053 or irb@estu.edu for any questions you may have about your rights as a research participant.

If you choose not to participate in this research study, please exit the survey. By clicking "Next", you agree: I have read the above information I agree to volunteer I am at least 18 years old I work in a STEM industry in NE Tennessee I am physically present in the United States

Thank you very much for participating in our research study!

- ○ I Agree (4)
- ○ Do Not Agree (5)

Skip To: End of Survey If CONSENT FORMYou are invited to participate in a study conducted by faculty at East Tennessee Stat... = Do Not Agree

Q52 Click to confirm you are not a bot.

End of Block: Consent Form

Start of Block: Introduction

Q2 **INTRODUCTION**

Thank you so much for taking the time to complete our survey on the regional STEM workforce in Northeast Tennessee (NE TN)! STEM stands for *science, technology,*

engineering, and math.

Our project objectives are to understand the hard skills, soft skills, and competencies that local STEM businesses are seeking in new ENTRY-LEVEL employees in STEM areas, considering all levels of education in NE TN. This survey should take between **15-20 minutes** to complete. Your progress will be saved as you go as long as you are using the same browser.

For this survey, an **ENTRY LEVEL job** is a job that is normally designed or designated for recent graduates of a given discipline and typically does not require prior experience in the field or profession. By **STEM businesses**, we mean those companies that employ people in fields related to *Sciences, Technology, Engineering, and/or Math disciplines, including but not limited to advanced manufacturing, robotics, health sciences, data science, etc.* Please see examples of STEM Hires and Non-STEM Hires in the table below.

We hope to use the results of this survey to improve the workforce pipeline by better preparing prospective employees in the public education system and in higher education for work in NE TN STEM industries and businesses, like yours! Our region has many strengths as do the people who live here. We want to entice more students to pursue STEM careers in part by showing them all the great employment opportunities in East Tennessee.

Upon completion of this survey, you will be prompted to share your name and email on a separate page for a chance to receive a **$50 Amazon Gift Card**. You will also be asked if you would like to be contacted for follow-up research. We will share (via email) a public community report of the results of this survey with you and your peer industries when the study is complete in Summer 2023. Results will be aggregated and will not be traceable back to individuals or companies.

Please complete this survey by **June 30, 2023, at 11:59 pm**. Thank you!

STEM Hire Examples	Non-STEM Hire Examples

Engineer Chemist Biologist Environmental scientist Machine/robot repair Data analyst Tech support Programmer Mechanic Medical professional	Executive aide Assembly line Manager Human resources Custodian Designer, artist (non-software) Customer support/call center staff Social media/communications specialist

End of Block: Introduction

Start of Block: Section 1: Organizational Professional Demographics

Q3 What is your job title? (Check all that apply)

- ○ President/Owner (1)
- ○ Vice-President, Finance (2)
- ○ Vice-President, Human Resources (3)
- ○ Vice-President (4)
- ○ Director (5)
- ○ Assistant Director (6)
- ○ Manager (7)
- ○ Assistant Manager (8)

- ○ Supervisor (9)
- ○ Other(s) (10) _____
- ○ Not sure/prefer not to answer (11)

Q4 What is your company name?

_____

Q5 What division or sector of the company do you work for (e.g., Research and Development, Human Resources, Manufacturing Line)?

_____

Q6 Please provide the company address that is based in Northeast Tennessee.

_____

Page Break

Q7 What is the approximate number of employees in your company based here in Northeast Tennessee?

_____

Q8 Select the choice that best describes your industry type.

- [ ] Computer software development (1)
- [ ] Construction (2)
- [ ] Death care services (3)
- [ ] Education (4)
- [ ] Equipment and machinery repair (5)
- [ ] Financial activities (6)
- [ ] Health services (7)
- [ ] Information and technology (8)
- [ ] Manufacturing (9)
- [ ] Personal care services (10)
- [ ] Pet care services (11)
- [ ] Pharmaceutical (12)
- [ ] Professional and business services (13)

- [ ] Research and development (14)
- [ ] Retail trade (15)
- [ ] Service industries (16)
- [ ] State and local government (17)
- [ ] Transportation and warehousing (18)
- [ ] Wholesale trade (19)
- [ ] Other (20) _____

Page Break

Q9 How many years have you been working for the company?

_____

Q10 How many years have you been in your current role?

_____

Q11 If you are in a supervisory role, how many employees do you oversee/manage?

_____

Page Break

End of Block: Section 1: Organizational Professional Demographics

Start of Block: Section 2: Skills

Q12 **Directions:** For the questions below, please rate the importance of each skill or attribute for ENTRY-LEVEL employees.

Select the score that best represents your opinion.
1 - NOT AT ALL important
2 - SOMEWHAT important
3 - VERY important
4 - EXTREMELY important

Q13 Given the ***basic skills*** listed below, please rate the level of importance concerning ENTRY LEVEL employees for 1) a GENERAL hire (e.g., HR employee, executive aid) and 2) a STEM hire.

	GENERAL hire					STEM hire				
	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)
Ability to read with understanding (Q13_1)	○	○	○	○	○	○	○	○	○	○

Ability to learn new skills (Q13_2)	○	○	○	○	○	○	○	○	○	○
Ability to apply basic math (Q13_3)	○	○	○	○	○	○	○	○	○	○
Ability to apply basic computer/technology skills (Q13_4)	○	○	○	○	○	○	○	○	○	○
Ability to follow instructions (Q13_5)	○	○	○	○	○	○	○	○	○	○

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Q14 Given the ***communication skills*** listed below, please rate the level of importance concerning ENTRY LEVEL employees for 1) a GENERAL hire (e.g., HR employee, executive aid) and 2) a STEM hire.

Select the score that best represents your opinion.
1 - NOT AT ALL important
2 - SOMEWHAT important
3 - VERY important
4 - EXTREMELY important

	GENERAL hire	STEM hire

	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)
Ability to convey ideas in writing (e.g., draft a report) (Q14_1)	○	○	○	○	○	○	○	○	○	○
Ability to convey ideas orally so others can understand (e.g., present to colleagues and supervisors) (Q14_2)	○	○	○	○	○	○	○	○	○	○
Ability to convey ideas in visual or graphical formats that provide information to an intended	○	○	○	○	○	○	○	○	○	○

audience (e.g., charts and graphs) (Q14_3)	
Ability to listen actively to obtain or clarify informati on pertaining to plans, processes , projects, or designs (Q14_4)	○ ○ ○ ○ ○ ○ ○ ○ ○ ○

Page Break

Q15 Given the ***problem-solving and critical thinking skills*** listed below, please rate the level of importance concerning ENTRY LEVEL employees for 1) a GENERAL hire (e.g., HR employee, executive aid) and 2) a STEM hire.

Select the score that best represents your opinion.
1 - NOT AT ALL important
2 - SOMEWHAT important
3 - VERY important

4 - EXTREMELY important

	GENERAL Hire					STEM Hire				
	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)
Ability to solve problems in general (Q15_1)	○	○	○	○	○	○	○	○	○	○
Employ the appropriate level of independence but seek help when needed (Q15_2)	○	○	○	○	○	○	○	○	○	○

Apply critical thinking skills to problem-solving and decision-making, including evaluating data/evidence to make informed decisions and considering a broad range of factors (e.g., fiscal, social, political, environmental, legal, geographic) influencing decisions (Q15_3)	○	○	○	○	○	○	○	○	○	○
Ability to think creatively or innovatively (Q15_4)	○	○	○	○	○	○	○	○	○	○

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Q16 Given the ***personal management skills*** listed below, please rate the level of importance concerning ENTRY LEVEL employees for 1) a GENERAL hire (e.g., HR employee, executive aid) and 2) a STEM hire.

Select the score that best represents your opinion.
1 - NOT AT ALL important
2 - SOMEWHAT important
3 - VERY important
4 - EXTREMELY important

	GENERAL hire					STEM hire				
	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)
Ability to maintain appropriate personal appearance (grooming, hygiene, clothing) (Q16_1)	○	○	○	○	○	○	○	○	○	○
Ability to follow schedules (Q16_2)	○	○	○	○	○	○	○	○	○	○

Ability to be on-time (Q16_3)	○	○	○	○	○	○	○	○	○	○
Ability to monitor the quality of work (Q16_4)	○	○	○	○	○	○	○	○	○	○
Ability to stay with a task until finished (Q16_5)	○	○	○	○	○	○	○	○	○	○
Ability to self-manage and work without direct supervision (Q16_6)	○	○	○	○	○	○	○	○	○	○
Ability to respect authority (Q16_7)	○	○	○	○	○	○	○	○	○	○
Ability to accept and utilize criticism (Q16_8)	○	○	○	○	○	○	○	○	○	○
Ability to show a high regard for safety	○	○	○	○	○	○	○	○	○	○

procedures (Q16_9)										
Ability to make plans and work toward goals (Q16_10)	○	○	○	○	○	○	○	○	○	○
Ability to recognize and correct own mistakes (Q16_11)	○	○	○	○	○	○	○	○	○	○
Ability to grow and learn in one's position (e.g., through professional development) (Q16_12)	○	○	○	○	○	○	○	○	○	○

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Q17 Given the ***leadership skills*** listed below, please rate the level of importance concerning ENTRY LEVEL employees for 1) a GENERAL hire (e.g., HR employee, executive aid) and 2) a STEM hire.

Select the score that best represents your opinion.
1 - NOT AT ALL important
2 - SOMEWHAT important
3 - VERY important
4 - EXTREMELY important

	GENERAL hire					STEM hire				
	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)
Facilitate communication among individuals, groups, and organizations (Q17_1)	○	○	○	○	○	○	○	○	○	○
Facilitate collaboration among individuals, groups, and organizations (Q17_2)	○	○	○	○	○	○	○	○	○	○
Manage personnel, programs, and services (Q17_3)	○	○	○	○	○	○	○	○	○	○

Page Break

Q18 Given the ***interpersonal skills*** listed below, please rate the level of importance concerning ENTRY LEVEL employees for 1) a GENERAL hire (e.g., HR employee, executive aid) and 2) a STEM hire.

Select the score that best represents your opinion.
1 - NOT AT ALL important
2 - SOMEWHAT important
3 - VERY important
4 - EXTREMELY important

	GENERAL hire					STEM hire				
	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)
Ability to use socially acceptable language (Q18_1)	○	○	○	○	○	○	○	○	○	○
Ability to show respect for others (Q18_2)	○	○	○	○	○	○	○	○	○	○

Ability to work well with people from diverse backgrounds (Q18_3)	○	○	○	○	○	○	○	○	○	○
Ability to cooperate with others and be a good team player (Q18_4)	○	○	○	○	○	○	○	○	○	○
Ability to advocate for self (Q18_5)	○	○	○	○	○	○	○	○	○	○
Ability to negotiate and resolve conflict (Q18_6)	○	○	○	○	○	○	○	○	○	○

Page Break

Q19 Given the ***personal integrity and ethics attributes*** listed below, please rate the level of importance concerning ENTRY LEVEL employees for 1) a GENERAL hire (e.g., HR employee, executive aid) and 2) a STEM hire.

Select the score that best represents your opinion.
1 - NOT AT ALL important
2 - SOMEWHAT important
3 - VERY important
4 - EXTREMELY important

	GENERAL hire					STEM hire				
	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)
Demonstrating personal interest and responsibility in work (i.e., engagement) (Q19_1)	○	○	○	○	○	○	○	○	○	○
Demonstrating personal integrity/Honesty in work (Q19_2)	○	○	○	○	○	○	○	○	○	○
Demonstrating an ability to adapt to change (Q19_3)	○	○	○	○	○	○	○	○	○	○

Demonstrating knowledge and understanding of the importance of professional ethics and legal responsibilities. (Q19_4)	○	○	○	○	○	○	○	○	○	○

Page Break

Q20 Given the ***data analytics and assessment skills*** listed below, please rate the level of importance concerning ENTRY LEVEL employees for 1) a GENERAL hire (e.g., HR employee, executive aid) and 2) a STEM hire.

Select the score that best represents your opinion.
1 - NOT AT ALL important
2 - SOMEWHAT important
3 - VERY important
4 - EXTREMELY important

	GENERAL hire	STEM hire

	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)	1 (1)	2 (2)	3 (3)	4 (4)	N/A (5)
Access and evaluate existing quantitative and/or qualitative data (Q20_1)	○	○	○	○	○	○	○	○	○	○
Collect quantitative and/or qualitative data (Q20_2)	○	○	○	○	○	○	○	○	○	○
Manage quantitative and/or qualitative data (e.g., spreadsheets, databases, protection of data) (Q20_3)	○	○	○	○	○	○	○	○	○	○
Analyze quantitative and/or qualitative data (Q20_4)	○	○	○	○	○	○	○	○	○	○

Interpret quantitative and/or qualitative data (Q20_5)	○	○	○	○	○	○	○	○	○	○
Use modeling, simulation, or visual reproduction to better understand problems and processes (Q20_6)	○	○	○	○	○	○	○	○	○	○

End of Block: Section 2: Skills

Start of Block: Section 3: Open-ended questions

Q21 Approximately, what percentage of your ENTRY LEVEL STEM hires have each of the following as their highest degree?

	0%			25%			50%			75%			100%
	0	10	20	30	40	50	60	70	80	90	100		
High school diploma ()													
Associate degree ()													
Industry certificate ()													
Bachelors ()													

Masters ()	
Post-graduate ()	
Other ()	

Q22 What, if any, other STEM-specific skills or experiences that were not mentioned above are important for your prospective STEM employees (e.g., familiar with specific software or instrumentation)?

_____

Q23 What could the K-12 education system in NE TN do to better prepare ENTRY-LEVEL STEM workers for your company or field (e.g., facilitate internships or volunteer opportunities, special software certifications)?

_____

Q24 What could the higher education system (e.g., community colleges, technical colleges, four-year universities) in NE TN do to better prepare ENTRY LEVEL STEM workers for your company or field (e.g., facilitate internships or volunteer opportunities, special software certifications)?

_____

End of Block: Section 3: Open-ended questions

Start of Block: Section 4: relationships and last thoughts

Q25 To what extent do you feel it's important to build relationships between:

	Not at all (1)	Somewhat (2)	Very (3)	Extremely (4)

Industry and PK-12th grade education in NE TN (Q38_1)	○	○	○	○
Industry and higher education in NE TN (Q38_2)	○	○	○	○

Q26 Share any additional comments or thoughts you have (optional):

_____

End of Block: Section 4: relationships and last thoughts

Start of Block: Section 5: Follow-up

Q27 Are you interested in volunteering to participate in a brief follow-up focus group or interview?

○ Sure. (1)

○ No, thank you. (2)

Display This Question:

Are you interested in volunteering to participate in a brief follow-up focus group or interview? = Sure.

Q28 Please provide the following information for us to contact you!

○ First name (4) _____

○ Last name (5) _____

○ Email (6) _____

End of Block: Section 5: Follow-up