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Evaluating Impact over Attendance: Enhancing Multifaceted Employer Engagement Programs for STEM Trainees

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Abstract: This article calls for a shift in evaluating employer engagement programs for STEM trainees, moving beyond attendance metrics to focus on career impact (Kozma et al., 2021; McGunagle & Zizka, 2020). It underscores the significance of experiential learning and industry connections. Rather than focusing on attendance, it advocates assessing programs such as site visits, networking events, career expos, and industry panels based on engagement quality, relationship building, and post-event outcomes (Howell et al., 2024; Jackson & Bridgstock, 2021; Male & King, 2019). Leveraging qualitative insights, this approach prioritizes impact over numbers, enhancing employability and expanding professional networks while providing career insights into diverse pathways.

Keywords: Employer Engagement, University-Industry Relations, STEM Career Development, Experiential Learning

As the job market becomes increasingly challenging due to the shifting economic priorities, technological advancements, and changing workforce expectations, many STEM trainees - Master's and PhD students and postdoctoral researchers, are reconsidering their career plans (Collins & Gray, 2024; Handshake, 2024; Rosenzweig et al., 2021). In academic environments, training focuses on building research skills, developing expertise in their subject area, and extensive knowledge within specialized fields (Fuhrmann, 2016). While rigorous academic preparation prepares STEM trainees to advance research, the World Economic Forum's *Future of Jobs Report* (2023) highlights a growing demand for broader skill sets among job seekers, such as technological fluency, analytical and creative thinking, curiosity, and lifelong learning.

Despite an increasing interest in diverse career pathways, there remains a lack of employer-related engagement programs such as information sessions, career fairs, and recruiting events focused on advanced-degree roles in industry research and development (R&D), government, and non-profit sectors tailored for STEM trainees (Meyer-Miner, 2021; Shrestha, 2022). This gap underlines the importance of career development programs, specifically employer engagement initiatives, in the professional development of STEM trainees (Rao & Sluder, 2024). According to Lehne (2024), companies gain access to next-generation STEM experts by collaborating with educational institutions to address STEM talent shortages. Tailored employer engagement programs are crucial for preparing individuals for non-academic career pathways, equipping them with the skills and connections necessary for success in industry settings (Ganapati & Ritchie, 2021).

This article highlights the need to assess employer engagement programs beyond surface-level attendance metrics, focusing on meaningful impacts such as participant skills development, fostering lasting connections between employers and trainees, and improving long-term career outcomes for STEM trainees. The author presents specific examples of tailored activities, their purpose, and how to evaluate them for effectiveness, offering actionable insights for career services to implement impactful programs that advance the readiness of STEM trainees for diverse career pathways.

Importance of Experiential Learning and Connections with Employers and Industry

Employers seek to recruit talented individuals who blend analytical rigor with creative problem-solving, technological fluency, and a willingness to engage in lifelong learning—skills that are often underemphasized in traditional academic training (National Association of Colleges and Employers, 2023). To bridge the gap between academic training and career success, experiential learning opportunities such as internships, co-ops, and research collaborations with industry allow trainees to tackle real-world challenges (Van Wart et al., 2020). As highlighted by Rao and Sluder (2024), offering experiences that extend beyond academic boundaries equips trainees with the critical skills necessary for career success.

While experiential learning provides hands-on experience, it is equally important for trainees to establish strong industry connections to fully prepare for the workforce. Building these connections and employer partnerships provides trainees with insights into workforce needs and emerging technologies (Business Higher Education Forum, 2024). Engagements with industry experts offer networking opportunities that lead to internships, full-time job placements, and collaborative research projects. By interacting with industry professionals, trainees gain access to a broader job market and receive mentorship and career guidance, helping them to navigate their career pathways more effectively (McGunagle & Zizka, 2020). Employer engagement activities such as information sessions, industry panels, and site visits play a critical role in enhancing preparedness and career prospects. This is especially important given that 53.3% of all Ph.D. graduates work outside academia, with industry being the largest employer, at 46.7% of graduates in 2023 (National Center for Science and Engineering Statistics, n.d.). Given the importance of experiential learning and employer or industry connections, assessment strategies that rely solely on attendance numbers fail to capture the full impact of a program on trainees' career growth.

Limitations of Attendance Metrics

While attendance numbers may signal initial interest, they often fail to indicate whether attendees gained valuable insights or took actionable steps afterward. A room full of participants might appear successful at a glance. However, this metric does not capture whether the event successfully met its goals, such as facilitating lasting professional connections, discovering new career opportunities, or offering helpful advice for their job search (Ivy Exec, 2023). Over-reliance on attendance risks overlooking whether these events serve all participants equitably or if certain groups remain underserved (Kantrov, 2017; Rodriguez et al., 2016). While tracking attendance can provide some demographic

insights, it does not fully assess whether engagement is meaningful. At my current institution, for example, follow-up surveys and tracking of career outcomes are conducted to help ensure that participants benefit equally from the engagement.

In some cases, high attendance might only reflect superficial engagement without a lasting impact on attendees' career development. To move beyond the limitations of attendance metrics, institutions must adopt a more holistic evaluation approach that captures the depth and sustainability of engagements. This includes integrating additional data points that can be collected through qualitative methods and focus groups.

Integrating Comprehensive Metrics and Focus Group Insights

Combining quantitative and qualitative methods is essential to better capture the impact of employer engagement programs on the career development of STEM trainees. Surveys conducted at multiple intervals—immediately after the event and again three months and six months later can provide insight into the long-term effects on trainees' career trajectories. By surveying at these intervals, career centers can track feedback, such as whether attendees have applied for positions with the employer hosting the event, received interviews, or secured job offers (see Appendix A for a sample employer event outcomes survey).

Key questions like "Did the event increase your interest in the organization?" or "Have you applied for positions at the organization since attending the event?" help capture relevant outcomes beyond attendance (McGunagle & Zizka, 2020). By tracking these outcomes over time, institutions can evaluate whether these events are truly helping trainees advance in their career paths.

In addition to quantitative data, focus groups with trainees and employers offer a richer perspective on whether events foster meaningful, career-impactful connections. Focus group discussions with employers can center on their recruitment goals and the talent they are engaging with (see Appendix B for sample questions for the employer intake call). In contrast, trainee focus groups can help identify whether employer topics align with career needs or where improvements could enhance career exploration (see Appendix C for sample focus group questions for trainees). These insights provide a clearer picture of an event's success than attendance numbers alone and highlight areas where trainee expectations and employer priorities may need closer alignment (Rodriguez et al., 2016).

Unlike surveys, focus group discussions allow for a deeper exploration of participants' motivations, career goals, and experiences, providing context that surveys and data cannot capture (Onwuegbuzie et al., 2009). By directly hearing from different perspectives, in this case, the trainees and employers, we can better identify the nuanced perspectives that inform the planning and adjustment of future employer engagement programs.

For instance, past focus group discussions at my workplace revealed that trainees were often unaware of the skills employers sought or how to prepare application materials for specific industries. This feedback led to more targeted employer engagement programs,

such as resume reviews by employers and informal one-on-one coffee chats, which better prepared participants for their job search.

Building on the importance of experiential learning and the limitations of attendance-based evaluation, a more holistic approach to employer engagement programs is necessary to ensure meaningful career impact for STEM trainees. By integrating comprehensive assessment methods, institutions can better understand how these programs influence career readiness, skill development, and long-term career placement outcomes (Leavitt & Leigh, n.d.). With these evaluation strategies in place, the next step is to design and implement tailored employer engagement programs that directly address the career needs of STEM trainees. The following section explores examples of activities that go beyond conventional career events, offering structured experiences that facilitate deeper connections between trainees and industry professionals.

Tailoring Employer Engagement Programs to Meet Career Needs

To maximize experiential learning, designing engagement programs that align with STEM trainees' specific career goals is crucial. These programs should move beyond general networking events to provide targeted interactions between trainees and industry professionals. Activities such as site visits, which provide an inside look into a company's operations, or employer panels focusing on specific industries can offer trainees insights into how their skills align with industry needs. By tailoring these experiences, trainees gain valuable insights into roles suited to their skills and interests.

Examples of Employer Engagement Activities

Employer Campus Days and Visits

Purpose: Host employers on campus for a full or half-day of activities, such as information sessions, small group coffee chats, resume reviews, or on-site interviews. These events allow trainees to gain insights into company culture, current projects, open roles, and industry trends. Beyond recruiting, campus visits can also spark conversations between employers and faculty or research staff, opening doors to collaborative projects, internships, or capstone projects tied to research or sponsored research opportunities. By fostering these connections, universities and employers build lasting partnerships that support both talent pipelines and innovation.

For example, we hosted a company for a Product Showcase and Resume Review. The company representatives brought in a few of their products for a showcase and demo for the audience, followed by an information session where they shared details about their organization. One-on-one resume review sessions were followed by hiring managers, including those from human resources, as well as scientists and engineers. These sessions offered attendees personalized advice while also providing insights into the organization's latest developments.

Engagement metrics, such as follow-up actions (e.g., interviews, job applications), are tracked through post-event surveys (see Appendix A) and follow-up contacts with employer partners to assess their impact. For example, we hosted a virtual information session for an employer to promote their organization and upcoming internship program.

The event had 30 attendees, and seven students applied to the internship program. These results were confirmed through email from the employer after the application deadline. This metric highlighted students' interest in the organization and program, helping us make the case for inviting the company to future events and identifying additional opportunities for engagement.

Career outcomes are tracked by measuring how many trainees secure internships or full-time positions after the event. In the previous example of the company that hosted the product showcase and resume review, we collected feedback through post-event surveys sent immediately, three months after the event, and six months after the event. From these survey responses, we learned that two attendees applied for full-time roles and advanced to final-round interviews. Of the two, one was offered the role and accepted the offer. These outcomes were confirmed through follow-ups with both the employer and the trainee, as well as LinkedIn tracking, which helped us demonstrate the value of engagement to prospective employers.

In addition, attendee feedback is gathered through post-event surveys, assessing how well attendees understand the industry's emerging trends. For example, about 70% of our trainees reported that the different employer engagements helped them better explore career pathways and feel more confident about their job search. This feedback informs the career center to offer specialized sessions for future events.

Company Treks/On-Site Visits

Purpose: Company treks provide STEM trainees with the opportunity to visit companies, research facilities, or national labs, offering a firsthand look at industry environments. These visits allow trainees to meet current staff members, tour R&D labs, and explore potential career pathways in industry positions.

To measure impact, we collect feedback on how the visit expanded attendees' networks and influenced their career exploration. Each quarter, we bring a group of 10-15 trainees to a local company for an on-site visit. Before the visit, we coordinate with the employer host to finalize the agenda, ensuring that the R&D labs, facilities, and career panelists align with our trainees' research areas and expertise. We also share a resume book of the trainees with the employer in advance. During the visit, trainees receive an introduction to the company, tour R&D labs and facilities, engage with staff through a career panel, and participate in a networking mixer. Afterward, attendees complete a survey to assess their experience (see Appendix D for a sample post-trek experience survey). We also share the feedback with our employer hosts to help them enhance future visits and strengthen their engagement with trainees.

In addition to assessing career exploration, we use the visits to measure job placements that result from these interactions. For example, after visiting a pharmaceutical company in the previous Winter quarter, one participant reported in the career center's internship survey that they secured an internship through a connection made during the visit. Tracking these placements allows us to assess the long-term impact of the treks and highlights the potential for employers to tap into our institution's talent pool. These data

also supports the value of on-site visits, helping us build stronger employer partnerships in the future.

Employer Led Skill-Building Workshops and Panel Discussions

Purpose: These events are designed to equip trainees with industry-relevant skills, including technical writing, leadership in R&D, and communication in industry settings. Panels can cover topics like industry trends, career development, and challenges in the STEM field.

In collaboration with the Career Development and Education Outreach office, we facilitate a 10-week "Communication Skills for Industry" program. The application-based program is designed for graduate students and postdocs to develop communication skills for a variety of interactions with industry professionals. The weekly workshops cover strategies for effective communication with R&D teams, hiring managers, and business-focused audiences. Participants also engage in small-group networking meetings with industry mentors, culminating in a capstone presentation and a competition featuring industry representatives.

The impact of these programs is evaluated through skill application and the development of relationships. We track how trainees apply the skills they learn in their research, projects, or internships, as well as how mentorships and collaborations are fostered through interactions with employers. The data is gathered through one-on-one career advising appointments, email exchanges with participants, and responses to pre- and post-program surveys. For instance, one participant in the communication skills program shared that it helped them engage with a range of industrial audiences, allowing them to communicate more effectively with experts across different fields (Dailing, 2024a). Additionally, employers who attended a panel and research symposium indicated that these engagements helped them build talent pipelines and foster new research partnerships by interacting with students and postdoctoral researchers (Dailing, 2024b).

Career Fairs and Recruiting Events

Purpose: Provide a centralized opportunity for trainees to engage with multiple employers from different industries. Unlike traditional career fairs, where attendees wait in lines for brief conversations at employer tables, advanced degrees career fairs feature employer presentations, group networking sessions, and one-on-one short interviews or chats. This format ensures meaningful interactions by aligning trainees with employers based on interests and career goals. Additionally, it enables trainees to explore job opportunities, engage with industry professionals, and gain insights into different career pathways. Career fairs and recruiting events are high touchpoints for trainees to network with hiring managers, learn about company cultures, and identify potential career prospects.

To assess impact, we evaluate the quality of interactions between trainees and employers. Before the career fair, we host preparation workshops for trainees and schedule calls with employer representatives to understand their hiring goals. These efforts ensure that trainees maximize their interactions with employers and that employers can effectively engage with the talent pool.

Post-event follow-ups, including surveys and employer debrief calls, help assess the event's effectiveness and address the needs of employers. In these debrief calls, employer representatives provide insights on attendee preparedness, resume competitiveness, and the alignment of candidate skills with industry expectations. Example questions include:

- "Were the candidates you interacted with well-prepared for the event?"
- "Do you feel the resumes included in the resume book aligned with your company's hiring needs?"
- "Did the structure and timing of the career fair align with your recruiting cycle or hiring windows?"
- "Were there any specific skills or experiences you were hoping to see that were lacking?"

These steps help us gather feedback on factors such as the relevance of candidate conversations and employer interest in following up with participants. For example, we ask employers whether they identified strong candidates, whether conversations aligned with their hiring goals, and whether they would attend future events. On the trainee side, we assess whether the event helped support their career goals, expanded their professional networks, or led to follow-up opportunities. This feedback is used to refine event formats, improve preparation workshops, and inform future employer outreach.

In addition to general feedback, we also follow up on specific employer needs identified in pre-event calls. This personalized approach ensures that the feedback we gather is actionable and aligned with expectations. It directly informs the design of future programming, including how we structure events and prepare trainees.

Career outcomes are also another key metric. We track how many trainees secure internships or full-time positions directly linked to the fair. For example, three attendees secured internship interviews following the recent career fair, and one received a full-time job offer. These outcomes are verified through trainee follow-ups and LinkedIn tracking, demonstrating the event's effectiveness in facilitating job placements.

Additionally, trainee feedback helps us better plan for future events. Surveys assess attendees' perceptions of the range of companies present, the usefulness of networking opportunities, and how well the event prepared them for the job market. For instance, 75% of respondents in a recent survey reported feeling more confident about their job search after attending a career fair. These insights guide improvements in career fair structure, employer outreach strategies, and preparatory workshops for attendees.

Conclusion

In today's competitive job market, employer engagement programs for STEM trainees are essential for bridging the gap between academic training and industry demands. This article has highlighted the importance of prioritizing impact over attendance in evaluating these programs, calling for a shift from attendance metrics to a more nuanced, impact-focused approach. By incorporating a comprehensive evaluation method, institutions can capture the value of programs that offer hands-on experience, mentorship,

and connections with industry leaders—key elements for preparing STEM trainees for diverse career pathways.

Through examples of tailored employer engagement activities, such as site visits, industry panels, and career fairs, this article highlights the role of these programs in expanding professional networks, enhancing job market preparedness, and developing essential skills that may be overlooked in traditional academic training. By doing so, universities and employers can build stronger partnerships that support the holistic development of STEM professionals, ultimately contributing to a more skilled and adaptable workforce.

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Appendix A
Employer Event Outcomes Survey

This appendix shows the survey sent to participants immediately after three and six months following the employer events. This survey is administered through the career development CSM platform, but a plain text version is provided below for reference. Questions marked with asterisks (*) have been set up with dependencies based on whether a yes or no answer was given in the survey.

First Name:

Last Name:

Email:

Select all the events(s) that you've attended:

Did the event(s) increase your interest in the organization(s)? Y/N

Did the event(s) help you in your career exploration? Y/N

*Since attending the event(s), have you applied for any internships or full-time positions at the organizations presented? Y/N

List the organization name(s), title(s), and position type(s) you applied for.

*Did you have any interviews with these organizations? Y/N

List the organization name(s) that you had interviews with.

*Did you receive any internship or job offers? Y/N

List the organization name(s) you received job offers from.

If you have any comments or feedback about your experience in these events or engaging with employer partners, please feel free to share that here. (Free response)

Appendix B
Questions for Employers (Intake Call)

This appendix provides sample questions used during introductory calls with employer partners, as referenced in the section on focus group discussions. These questions can be adjusted based on the individuals in the conversation, such as representatives from human resources, talent acquisition, hiring managers, or technical professionals like scientists and engineers. The discussion aims to understand the company's hiring needs, alignment with our institution's research strengths, and interest in employer engagement opportunities.

1. Can you share insights into your company's research focus and key areas of R&D?
2. What types of roles do you typically hire for, and what skills or expertise are you seeking?
3. What entry-level R&D roles are available for PhD candidates with no industry experience?
4. Does your organization hire master's-level candidates? If so, are they considered part of early talent recruitment alongside undergraduates?
5. Have you engaged with our university before? If so, what types of programs or initiatives have you participated in?
6. Would your team be interested in participating in recruiting events, career panels, site visits, or mentorship programs?
7. Are there specific ways we can facilitate connections between your company and our graduate students/postdocs?
8. What are your priorities for university partnerships? (e.g., talent recruitment, brand visibility, collaborative research, faculty engagement)

Appendix C
Focus Group Questions for Trainees

This appendix outlines the sample questions used in a focus group conducted with trainees to gain deeper insights into their career needs and exploration process. Participants were divided into two groups: one for master's students and another for PhD trainees and postdocs.

1. Why did you choose to engage in the professional development training, workshops, and events that you have so far? What were your motivations?
2. Can you share any specific examples where your engagement with a program or event led to tangible benefits in your career and professional development?
3. What gaps do you see in our professional development offerings? Are there topics you feel should be covered but currently are not or areas that could be addressed differently?
4. What are some challenges you've experienced (or know others have experienced) in participating in professional development activities and events?
5. How have you approached career exploration? What resources or experiences have been the most helpful in identifying potential career paths?
6. Have you engaged with employer-hosted events at our institution? If so, what aspects of those experiences were most valuable? If not, what prevented you from attending?
7. What other feedback do you have for us?

Appendix D
Trek Experience Post-Survey

This appendix contains the survey sent to participants after they attend a company trek. This survey is conducted anonymously through the career development CSM platform and has been modified to plain text, as shown below.

1. Are you a: (a) Master's Student (b) PhD Student (c) Postdoc
2. What trek did you participate in? Pick from the list.
3. Please rate your agreement with the following statements regarding different aspects of the trek: Likert Scale (Strong Disagree - Strongly Agree; Not Applicable)
    a. The presentation provided valuable insights into the company's mission, goals, and culture.
    b. The presentation increased my interest in career opportunities at this company.
    c. The tour was informative and gave me a better understanding of the company's activities and resources.
    d. The opportunity to see the lab facilities added value to my overall experience of the trek.
    e. The panelists effectively shared their experiences and expertise in their respective roles.
    f. The panelists addressed relevant and important questions about working at the company.
4. We spent an appropriate amount of time at the company.
5. Are you considering applying to full-time positions/internships at this company? (Yes/No/Maybe)
6. Did the trek meet your expectations with regard to providing information about the organization and gaining insight into career opportunities? (Yes/No/Maybe)
7. Please share any other feedback or suggestions here. (Free response)