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To cite this article: Yun Dong, Benjamin Ahn & Uriah J. Tobey (2021): Exploring Engineering Managers' Perspectives on the Actions of Engineering Managers and Newly Hired Engineers During the New Engineers' Socialization Period, Engineering Management Journal, DOI: [10.1080/10429247.2021.1922220](https://doi.org/10.1080/10429247.2021.1922220)

To link to this article: <https://doi.org/10.1080/10429247.2021.1922220>



Published online: 27 May 2021.



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# Exploring Engineering Managers' Perspectives on the Actions of Engineering Managers and Newly Hired Engineers During the New Engineers' Socialization Period

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**Abstract:** The purpose of this study is to explore engineering managers' perspectives on what actions they should perform to assist newly hired engineers and what proactive steps newly hired engineers should take during the onboarding/socialization period. In total, nine unique managers' actions and nine distinct new engineers' actions were identified by applying Morrison's socialization framework and interviewing seven engineering managers working in aerospace companies. This study offers practical actions that engineering managers and new engineers can apply during the socialization period, and it provides research design guidance that engineering managers can use to find additional actions attuned to their organizations/workgroups.

**Keywords:** Socialization, Onboarding Process, New Engineers, Proactive Steps, Actions, Manager Perspective, Engineering Education

**EMJ Focus Area:** Engineering Management Profession

Organizational socialization refers to the process whereby newly hired employees learn the skills, knowledge, and behaviors required to accomplish their assigned roles and responsibilities in their new organizations (Bauer et al., 2007; Haueter et al., 2003; Van Maanen & Schein, 1979). Organizational socialization is an important research topic (Reichers, 1987) because successful socialization is linked to high positive job performance and increased retention (Ashforth et al., 2007; Bauer et al., 2007). Successful organizational socialization is also essential for employers to build and support a workforce (Bauer et al., 2007; Collings & Mellahi, 2009).

Research has shown that new employees' proactive behavior during the socialization process predicts their workplace outcomes (Ramus & Steger, 2000; Saks et al., 2011). These behaviors include achieving role clarity, positive integration into the workplace, job satisfaction, and retention (Ashforth et al., 2007; Saks & Gruman, 2014; Saks et al., 2011).

Managers also play a critical role in their new employees' organizational socialization (Nifadkar et al., 2012). Managers regularly interact with new employees during the socialization period, and they are responsible for ensuring a successful onboarding process. Nonetheless, there is limited research about managers' actions during newly hired employees' socialization period. We know little about what actions managers take and what initiatives managers expect from new employees for their successful socialization into their companies. Investigating these actions and applying them in practice could lead to new employees' successful

socialization outcomes, such as acquiring the skills and information needed to complete their jobs, developing relationships with coworkers, and being socially accepted by a workgroup. Such socialization could also lead to new employees sharing their organizations' principles and cultures and being content with their new jobs and responsibilities.

In this study, the research team explored managers' perspectives on what supportive actions should be taken by managers and what proactive steps should be taken by new engineers during the socialization period in aerospace and defense (A&D) organizations. By interviewing seven managers from A&D organizations, the research team identified managers' perspectives on assisting new engineers in socializing into an organization and what proactive steps new engineers should take during the socialization period.

## Literature Review

Previous research identified several types of behaviors that new employees proactively and commonly demonstrate during the organizational socialization period. Ashford and Black (1996) identified seven types of behaviors: seeking information about their job positions, workgroups, and organizations; seeking feedback about their performance from supervisors and coworkers; attending social events; networking with people outside their workgroups who can help with their career advancement; building relationships with their coworkers and managers; negotiating job changes with managers; and having a positive attitude toward their new work environment. Others (e.g., Korte, 2009; Wanberg & Kammeyer-Mueller, 2000) have also found similar employee proactive behaviors in their studies. More recently, other studies (e.g., Cooper-Thomas et al., 2012; Harris et al., 2020; Jokisaari & Vuori, 2014) have expanded the literature with other proactive behaviors of new employees. These include working hard and proving abilities to coworkers; providing information or advice to other coworkers; completing tasks while learning different company processes; participating in team projects and being a reliable team member; exchanging information or resources with coworkers in the organization; and making others feel good about themselves during interactions. Many of these proactive behaviors have been linked to several positive outcomes for new employees, such as new employees' sense of belonging (Ashford & Black, 1996; Saks & Ashforth, 1997; Saks et al., 2011; Xian et al., 2018); a higher level of understanding of a new employee's roles and responsibilities (Ashforth et al., 2007; Wingerter & Ahn, 2020); job satisfaction (Wanberg & Kammeyer-Mueller, 2000; Wingerter & Ahn, 2020); integration into their workgroup (Wingerter & Ahn, 2020); and improved quality of relationships with coworkers (Lapalme et al., 2017).

New employees' proactive behaviors during the socialization period are generally well known, but managers' actions that assist new employees are just as important. Previous studies have highlighted the critical roles both new employees and managers play in new employees' socialization process and outcomes (Ellis et al., 2017; Jokisaari, 2013; Korte et al., 2019; Lapointe & Vandenberghe, 2018; Rubenstein et al., 2020). It is, therefore, crucial to examine what managers need to do to assist new employees. Investigating managers' supportive actions during the new employee socialization period is valuable for enhancing new employees' socialization outcomes.

Studies have identified some supportive behaviors from managers in the socialization period. Providing information is one of the most commonly applied and discussed actions taken by managers. Managers offer meaningful information (Baard et al., 2004; Deci et al., 1994; Ellis et al., 2017), which Ellis et al. (2017) defined as providing social and task-related information to new employees. Providing information can also encompass giving guidance and responses to new employees' questions, as identified by Korte et al. (2015). Providing information increases new employees' opportunities to interact with coworkers (Baard et al., 2004; Deci et al., 1994; Ellis et al., 2017; Korte, 2009) and enhances their sense of belonging to their workgroups and organizations (Nifadkar & Bauer, 2016). It also helps them gain a deeper understanding of the working environment, which may lead to higher role clarity and job satisfaction (Saks & Gruman, 2014; Saks et al., 2011), while greater job satisfaction can improve engineering business outcomes (Laglera et al., 2013). Furthermore, well-structured social or learning information sessions (e.g., orientation programs) provided by organizations assist new engineers in achieving role clarity and workgroup integration (Lapalme et al., 2017).

Managers also display replication behavior when they show new employees how the current practices of their organizations are carried out. They might also display determination behavior or encouragement of self-initiation, whereby they give new employees limited information and take a hands-off approach (Korte et al., 2015; Harris et al., 2020). Providing a sense of choice (Baard et al., 2004; Deci et al., 1994; Harper & Utley, 2001) and evaluating new employees (Ellis et al., 2017) were identified as other supportive behaviors taken by managers. Providing a sense of choice indicates that managers give new employees some freedom to make choices independently (Harper & Utley, 2001). Evaluating new employees requires managers to examine the level of new employees' competencies.

### Gaps in the Literature

Despite what is known about new employees' and managers' behaviors, there are several gaps in the literature. First, the available literature places emphasis primarily on how managers could affect new employees' socialization outcomes, rather than offering a specific investigation of the supportive actions that managers perform to benefit their new employees. Furthermore, most previous studies examined managers' supportive actions from employees' perspectives (e.g., Baard et al., 2004; Deci et al., 1994; Ellis et al., 2017; Korte et al., 2015), limiting the understanding of managers' perspectives on their actions supporting new employees' socialization (Ellis et al., 2017). Managers and new employees may have different opinions on which managers' actions are supportive (Wu & Parker, 2014). Therefore, studies that capture managers' perspectives could supplement the literature.

Second, there has been limited study on the actions that managers expect from their new engineers during the socialization period. They may expect new engineers to take specific actions to contribute to the workgroup and organization during the socialization process. Through their experiences working at an organization and with other new engineers, managers are likely to have their own specific perspectives on which actions new engineers need to perform. Given that the literature is largely based on employees' perspectives, additional actions could be missing (Cooper-Thomas et al., 2014; Saks & Gruman, 2014). Capturing managers' perspectives is especially critical, as not all actions taken by new engineers lead to positive socialization outcomes. Thus, it is worth exploring managers' opinions on what proactive steps new employees should take to benefit them.

Third, further exploration is required to determine what managers and new employees should do to achieve those actions. Specific action items that managers can use in practice are not fully discussed in the previous literature. Previous studies have commonly applied quantitative research methods (e.g., Ellis et al., 2017; Jokisaari & Vuori, 2014; Saks et al., 2011; Wingerter & Ahn, 2020). In contrast, qualitative research allows researchers to conduct in-depth exploration of detailed descriptions (Borrego et al., 2009). Therefore, in-depth qualitative research can be used to explore the actions that managers expect from new employees during socialization.

Fourth, many studies were examined in a context outside engineering disciplines (e.g., Baard et al., 2004; Nifadkar et al., 2012; Rubenstein et al., 2020; Saks et al., 2011; Woodrow & Guest, 2020). Engineering disciplines have their own specific professional values and norms (Kowtha, 2008), and thus managers' supportive actions and new employees' proactive steps may be different in this field. Organizations in the A&D industry employ engineering graduates from multiple engineering majors, including electrical, mechanical, manufacturing, computer-related, and aerospace engineering (McMasters & Cummings, 2002). Thus, organizations in the A&D industry reflect the interdisciplinary workgroups that many other organizations and industries may have in engineering.

In this study, we focus on the *actions* needed for achieving successful socialization. With the focus on "actions," this study extends the understanding of engineering managers' and new engineering employees' proactive steps in socialization.

### Theoretical Framework

The framework for this study is Morrison's (1993) four domains of socialization, as shown in Exhibit 1. According to Morrison, successful socialization to a new workplace occurs when new employees achieve four domains: Task Mastery, Role Clarification, Acculturation, and Social Integration (Feldman, 1976, 1981; Korte, 2019; Louis, 1980; Nelson, 1987; Reichers, 1987; Van Maanen, 1976). The *Task Mastery* domain refers to new employees mastering skills and acquiring knowledge to perform and complete job-related tasks. The *Role Clarification* domain refers to new employees understanding the roles and responsibilities of the assigned position. The *Acculturation* domain refers to new employees understanding the culture of their workgroups and the organization. The *Social Integration* domain refers to new employees gaining social acceptance in their workgroups and organizations.

Morrison's framework guided the design of the interview questions and the analysis of the interview data. Specifically, the



research team designed interview questions around the four domains: they asked questions about what actions managers take to help new engineers master the required skills and knowledge for job performance; to understand their roles and responsibilities; to understand their workgroup's culture; and to achieve social integration into the workgroup. The team also asked managers what actions new engineers should take to achieve competence in the four domains, and it categorized managers' and new engineers' actions into these four domains in the analysis phase.

### Method

The qualitative research method was applied in the study as it allowed the research team to employ Morrison's socialization framework to examine the perspectives of engineering managers regarding their actions and those of newly hired engineers in aerospace organizations during their socialization period. According to Maxwell (2013), the qualitative research method is appropriate when "understanding the particular contexts within which the participants act, and the influence that this context has on their actions" (p. 30).

### Data Collection

One-on-one semi-structured interviews were selected for the data collection approach. Semi-structured interviews allowed the team to ask prescribed and follow-up questions about the actions the managers performed and the proactive steps expected from new engineers. The team created an interview protocol to be used during the interviews. The interview questions in the protocol were separated into four main sections. Section 1 included questions about the company, work environment, onboarding process, employee retention, and employee satisfaction. Section 2 covered

questions relating to managers' evaluations of the newcomers' performance. Section 3 addressed managers' perspectives on managers' and new engineers' actions for their successful socialization. These questions were developed to capture the four domains of Morrison's framework (i.e., Task Mastery, Role Clarification, Acculturation, and Social Integration). Section 4 included a set of questions on what managers believed were the characteristics of an ideal candidate for an entry-level engineering position.

The interview questions and procedure within the protocol were checked and refined by conducting pilot interviews with two engineering managers who worked in engineering organizations. Based on the pilot participants' feedback, several questions were re-worded for clarity. Questions about company goals and missions and the characteristics of ideal new engineers for their organization were also added.

The team received approval from the Institutional Review Board (IRB #18-243) to proceed with recruitment and data collection. Participant recruitment began by creating an electronic recruitment flyer detailing the study's purpose and requesting participation. To be eligible for an interview, participants had to have an engineering degree and managerial experience in an A&D organization. Participants were also required to have worked with newly hired engineers.

In spring 2019, the team sent a recruitment flyer to approximately 20 engineering managers who worked in aerospace organizations and whom the research team knew personally or professionally through previous collaborations. The team requested their participation if they met the selection criteria, and they were asked to forward the flyer to colleagues within their companies. The team also sent the flyer to a few employees at aerospace organizations who were former students of an aerospace engineering department in the U.S. They were asked to forward the flyer to their

managers. The team encouraged the primary contacts (i.e., 20 engineering managers and former students) to share the flyer with as many demographically diverse (e.g., ethnicity and gender) groups of engineering managers as possible.

After a couple of weeks of recruitment, the research team recruited one female and six male engineering managers from four different A&D companies. All managers had several years of experience working with new engineers. At the time of the interviews, the participants' formal titles included engineering program managers, directors, chief engineers, and fellows. All but one participant held several titles/roles during their career in their organizations. These role distinctions matter because as the participants (engineering managers) moved from one workgroup to another, their responsibilities changed, as did the duties of the people (e.g., new engineers, colleagues, etc.) with whom they worked. As new employees entered their workgroups, the participants had to apply proven or new actions to help the new members of their workgroup come onboard. Hence, the participants' wide range of experiences working with new engineers from various workgroups provided the research team with rich insights and information about critical actions. Additional information about the participants can be found in [Exhibit 2](#). The four companies that the participants worked for were some of the largest aerospace organizations in the U.S. based on their market capitalization and revenues. All companies had their headquarters in the U.S., and the companies' portfolios included civil, commercial, defense, and space systems.

One research team member, who worked at aerospace companies and who conducted the two pilot interviews, interviewed all seven participants. The team decided to have one person conducting all the interviews. The participants who the research team did not have direct physical access to were asked to participate in the interviews over the phone. Of the seven interviews, five were conducted over the phone, and the other two were conducted face to face. The interviewer made every effort to carefully follow the interview protocol and interview manners and procedures, in order to limit any discrepancies between the two different modes of interviews. The interviewer also made every effort to listen carefully to any informal communications (e.g., pauses and intonations) during the phone interviews. All interviews were audio-recorded, and all participants were compensated with a gift card worth 99.99 USD. An external transcription-service company transcribed all seven interviews word for word.

**Exhibit 2.** Participant Demographics and Information

| No. | Gender | Ethnicity | Work Experience in the AE Industry | No. of Managerial Positions |
|-----|--------|-----------|------------------------------------|-----------------------------|
| 1   | Male   | Black     | 5–10 years FT in AE                | 2                           |
| 2   | Female | White     | 30–35 years FT in AE               | 3+                          |
| 3   | Male   | White     | 30–35 years FT in AE               | 3+                          |
| 4   | Male   | White     | 5–10 years FT in AE                | 1                           |
| 5   | Male   | White     | 16–20 years FT in AE               | 3                           |
| 6   | Male   | White     | 5–10 years FT in AE                | 2                           |
| 7   | Male   | White     | 11–15 years FT in AE               | 3 +                         |

AE = Aerospace Engineering, FT = full-time

*Data Analysis*

The research team, which consisted of two faculty members, two graduate students, and three undergraduate research students, conducted the data analysis. The two faculty members have experience leading and publishing research studies applying the qualitative research method. One of the graduate students had co-op experiences in several aerospace companies. The other graduate student had taken graduate-level qualitative research method classes and had prior coding experience. The three undergraduate students working on the project were all majoring in aerospace engineering.

The average interview duration was 61 minutes, and the average number of pages in a transcript was 18. The research team used open-coding and constant comparative methods, following the procedures outlined by Glaser and Strauss (1967) and Miles and Huberman (1994), using a combination of spreadsheet and qualitative software to create a codebook and to code the transcripts.

As the first step in the analysis, the research team listened to the audio recordings and compared them with the transcripts to ensure the audio files were correctly transcribed. The members of the research team then read all seven transcripts. They came to a consensus on the three transcripts with the most details and information about the manager's supportive actions and newcomer's proactive behavior. These three transcripts were used to develop the first version of a codebook.

The research team members individually reviewed the three transcripts and created codes based on the responses. The purpose of the codes was to identify and capture the key ideas from participants' responses, which could be words, phrases, sentences, or even paragraphs of transcripts depending on the level of detail used to describe the action. For each code, a code name, code definition, and sample responses (i.e., quotes) from the transcripts were included. Upon completion of individual coding, the research team met and discussed all components of the code. If there were disagreements (e.g., code name or definition), the group discussed them until they reached a consensus.

The codebook developed from the first three transcripts was then used to code the remaining four transcripts. At least three research team members coded each transcript. All seven transcripts and their codes were discussed in research group meetings. In these meetings, codes were compared and contrasted to ensure each code was unique among the others by checking their definitions and example responses. Furthermore, if needed, new codes were generated to represent new actions, and these were added to the codebook. A spreadsheet containing a list of all codes according to the four domains was created. Once the research group had coded all transcripts and had a complete list of actions from seven participants, the team compared and contrasted the actions with existing actions identified in the socialization literature. This effort was made to develop insights into the emergent findings.

**Results**

Although the total participant number is small ( $n = 7$ ), the participants had first-hand accounts of working with new engineers. They provided rich and detailed descriptions of their actions and their expectations of new engineers' efforts in their respective aerospace companies during the new engineers' socialization period. The research team's goal was to present the specific actions practiced by the individual engineering managers in their organizations, rather than to show generalizable activities for all engineering managers across all aerospace companies by collecting and aggregating data from many managers. The seven



engineering managers formed information-rich cases (Patton, 2015). Other qualitative studies have used a small number of participants to investigate a variety of topics such as students' experiences in STEM education (Foor et al., 2007), ruling relations that exist in U.S. universities (Pawley, 2019), and student leadership development (Komives et al., 2005).

The results section is divided into two parts: the first part presents the manager-identified supportive actions for assisting new engineers during their socialization period, while the second part presents the manager-identified proactive steps that newly hired engineers should take during their socialization process. The identified actions are categorized based on Morrison's (1993) framework: Task Mastery, Role Clarification, Acculturation, and Social Integration.

### *Managers' Supportive Actions*

Participating managers in A&D organizations identified nine supportive actions that managers practice to help newly hired engineers' organizational socialization. Exhibit 3 shows an overview of the identified actions for each domain. The nine actions are described with their definitions, as derived from the interviews and example quotes from participants. The label next to each participant quote provides additional information about the participants: participant number, participant's gender, and years of experience. For example, P1\_M\_5–10 is Participant 1, who is male and has 5 to 10 years of experience working in the A&D industry.

*Task mastery domain supportive actions.* This study found four manager actions supporting new engineers' task mastery.

- Assign appropriate tasks – Managers assign tasks with a certain level of difficulty to new engineers to develop new skills. These tasks help new engineers to obtain new skills and knowledge while completing the tasks.  
... exposure to those various skills by assigning them the appropriate projects. They're never going to learn it if they don't have the opportunity to actually practice it. It's much, much more effective to have them actually use it on a project. Therefore, giving them the appropriate projects to develop those skills is a very important piece. (P4\_M\_5–10)
- Encourage workgroup collaboration – Managers encourage new engineers and their workgroup members to collaborate in order to enhance new engineers' skills, such as programming, analytical, and professional skills (e.g., communication and problem-solving). Managers introduce new engineers to their workgroup members and set expectations together with the members to help new engineers learn the required skills. The workgroup members are also asked to check and review new engineers' work. In this way, the workgroup helps new engineers get up to speed on what skills the workgroup needs and how to apply them. These collaborations are focused on skill acquisition and should not be confused with a formal mentoring initiative geared more toward personal growth for the new engineer.  
... one of the things I would want them to start looking at is we have kind of key areas that we want them to concentrate on [sic]. So their communication skills, their problem-solving skills – are they teaming together well with people? So those are areas where I would want to see them

making strides on top of their general work statement ... it's having a successful system in place to support them, so it's making sure that the team knows you're getting a new hire ... while also instilling an expectation across the group that we need to help this person get up to speed as quickly as possible. So it's all those pieces kind of playing together to make sure that we have that in place. (P6\_M\_5–10)

- Provide learning materials/opportunities – Managers provide new engineers with learning materials and opportunities to help them become proficient at the technical skills and knowledge required to perform their job responsibilities. In the Task Mastery domain, the learning materials include the company database, procedures and resource pages from the internet. Learning opportunities included attending a company-initiated symposium.

I've even seen some teams be so advanced where they have a Wiki page of all the basic information for the technology they're dealing with [sic]. That makes onboarding go a lot faster. (P1\_M\_5–10)

Getting them the ability to go out to symposiums is always really good because you can compare the work you're doing to what other people across different companies and different areas are doing. (P3\_M\_30–35)

- Assign mentors – Managers assign mentors who assist new engineers with their work-related tasks, for example, showing them how to acquire skills and knowledge and overcome work-related challenges. In this domain, the mentor is mainly there to help them with on-the-job training and are not yet focused on assisting the engineer in adapting to the company's culture.

... typically, a manager will find a technical mentor that they can ask, and obviously their team members, ... there's nothing, to me, more effective than good mentorship. I think having a few folks on your team that are willing and able to continue doing and executing to [sic] their job roles, but then also have the time and energy to mentor your new hires or your newer teammates, is priceless. (P1\_M\_5–10)

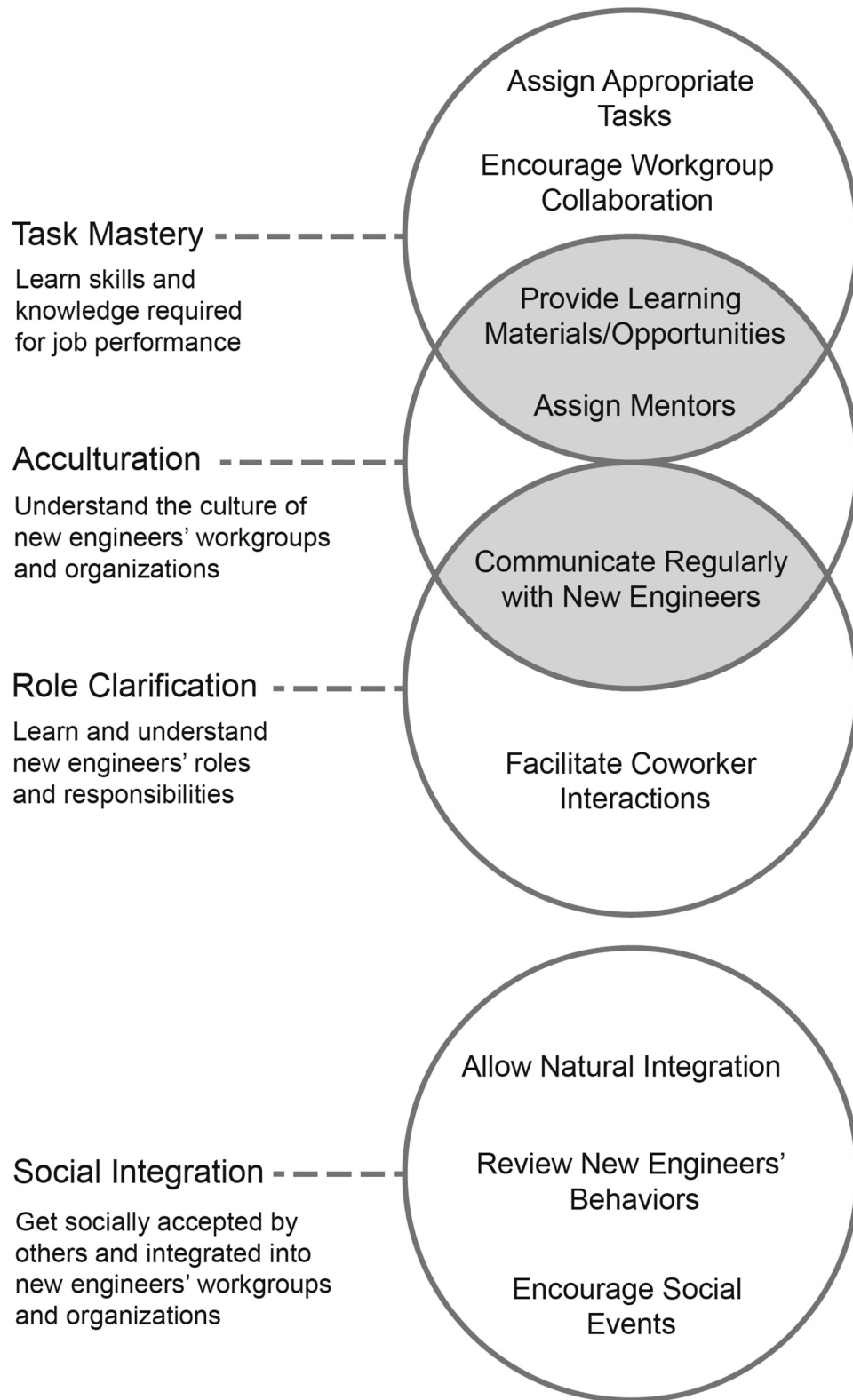
"And then also just setting them up with the right mentor ... usually [new engineers are] working with the senior engineer who's kind of going through them with them in parallel through this process and just kind of as a checkpoint for them, helping to explain this is what we do, this is kind of why, this is why we do it. (P4\_M\_5–10)

*Role clarification domain supportive actions.* The managers discussed two main actions in helping new engineers understand their roles and responsibilities.

- Communicate regularly with new engineers – Managers regularly communicate with new engineers to discuss their job responsibilities and expectations and set new engineers' annual goals. They also discuss approaches to achieving the goals.

I think management needs to sit down with those folks in [sic] a regular basis and make sure they understand what their roles are, what their commitments are. [Company name] also has a formal process to do that, which is the performance system,

**Exhibit 3.** Summary of Managers' Supportive Actions



where every year you sit down and lay out what your goals are and what you're committing to for the year. (P2\_F\_30-35)

- Facilitate coworker interactions – Managers facilitate interactions between engineers who have had the same or

similar positions or responsibilities as new engineers and encourage interactions between them so that new engineers can observe and learn how the experienced engineers perform their roles and complete tasks. The experienced

engineers can be from either inside or outside the new engineers' workgroup.

... introduce them to others that are already fulfilling those expectations, meaning maybe some more veteran engineers around this individual that are fulfilling those roles, if that makes sense, so they can actually see it modeled. (P7\_M\_10-15)

Notice that facilitating coworker interactions, as described by this manager, differs from a formal mentoring process discussed earlier as this system is more informal and passive. The new engineer is in proximity with the experienced coworker, hoping that skills will be transferred through observation and interactions.

*Acculturation domain supportive actions.* There were three actions that managers took to assist new engineers in achieving acculturation. All three actions were relating to those identified in the Task Mastery (i.e., provide learning materials/opportunities and assign mentors) and the Role Clarification (i.e., communicate regularly with new engineers) domains, but with subtle differences that relate more to the long-term investiture of the new engineer into the culture of the organization.

- Providing learning materials/opportunities – The types of learning materials and opportunities managers provide to new engineers differ between the Acculturation and Task Mastery domains. The primary learning material mentioned in the Acculturation domain was a piece of paper hung on the wall, such as a poster, which showed the expected behaviors in the working environment. In contrast, the Task Mastery domain's learning materials were a company database. The Acculturation domain's learning opportunities were attending customer and workgroup meetings and meeting with other engineers to learn about classes, workshops, and conferences offered inside and outside the company. In contrast, the Task Mastery domain's learning opportunities were mainly about attending a company-initiated symposium to learn job-required skills, such as programming languages, analysis skills, and communication skills.

The thing that helps new hires the most is exposure to the customer. If you have customers in town for meetings, invite your new hires – not necessarily to contribute to the meeting if they are not able to, but at least be in the room to hear what the customers are talking about, hear how your more experienced individuals are talking and answering customers' questions. (P1\_M\_5-10)

- Where I work now, culture is very important. What defines our culture right now is something we call some of the '[the name of the organization] behaviors', and there is [sic] ... seven of them. Those behaviors are expectations of ourselves, which, in itself, defines the culture. One of the behaviors is being a listener. Okay, well, if you work at a company that one of the behaviors that they expect in their employees is to be listeners, then that's going to embody a culture of taking time to meet with each other and listen to each other's diverse thoughts, for example. It's on a piece of paper and we hang it on the wall, but it doesn't say 'culture'. It actually talks about the behaviors. (P7\_M\_10-15)

- Assigning mentors – Assigning mentors in the Acculturation domain is very similar to that mentioned in the Task Mastery domain, which indicates that managers need to assign an appropriate coworker to new engineers. This coworker can serve as a teacher or a role model for new engineers to observe and learn the culture of the workgroup/organization. In the Acculturation domain, the difference is that these mentors are providing more guidance about the new engineer fitting into the culture for the long term versus short-term skill acquisition.

So, it goes back to the mentor, I need to assign someone who is more outgoing and more willing to be a teacher, so that you can partner them with that new engineer to help them kind of learn the culture of the group, and so to set them up to be successful on how they can do the same thing and quickly integrate with that group. (P6\_M\_5-10)

- Communicating regularly with new engineers – Like its instantiation in the Role Clarity domain, managers periodically communicate with new engineers to help them learn the culture of workgroups and the organization. By taking this action, managers regularly give new engineers feedback and check whether they understand the culture.

*Social integration domain supportive actions.* Managers assist new engineers with social integration by performing the following two actions.

- Allow natural integration – Managers allow the natural building of relationships between new engineers and members of their workgroups. They believe managers should not play a prominent role in the social integration domain. Instead, managers prefer to see new engineers integrate themselves into workgroups through their interactions with their coworkers.

If you have a fairly healthy group, they may get together for a lunch every once in a while; they may go out to grab coffees together. And so I would encourage the person to integrate themselves into that. I can obviously have a manager-led lunch or a manager-led coffee hour, but that's going to be not as organic as the individual working to integrate themselves into the way the group does. (P6\_M\_5-10)

- Review new engineers' behaviors – Managers pay attention to the new engineers' actions and determine which actions prevent them from socializing with their colleagues. Participants perceived that managers are responsible for noticing and intervening in situations where new engineers have negative traits or take inappropriate actions.

So, it is up to the manager to sit down with the new college grad if they have seen them with whatever, some trait that is really blocking them from becoming part of the group, it's the manager's responsibility to sit down with them and say, 'Hey, you're not letting anyone else in these meetings. You take over everything. You have got to listen to what other people are saying. You're not the center of the universe,' if that's the issue. (P2\_F\_30-35)

- Encourage social events – Managers encourage new engineers to participate in social events or team bonding activities. These events create opportunities for new engineers to interact with their colleagues outside workgroup



settings. Managers also encourage workgroup members to invite new engineers to attend social gatherings and to facilitate interactions between members and new engineers during the events.

The sports stuff, and the clubs, and the softball teams would help mesh a bunch of that together between the new employees and the older senior folks. (P3\_M\_30–35)

I'd probably encourage my team that they're inclusive, make sure that 'If you guys are going out for lunch, it'd be really good if you invite the new hire.' Or, 'Hey, if you're going to go grab a coffee and go look at an airplane, bring them along, let them learn something. (P5\_M\_15–20)

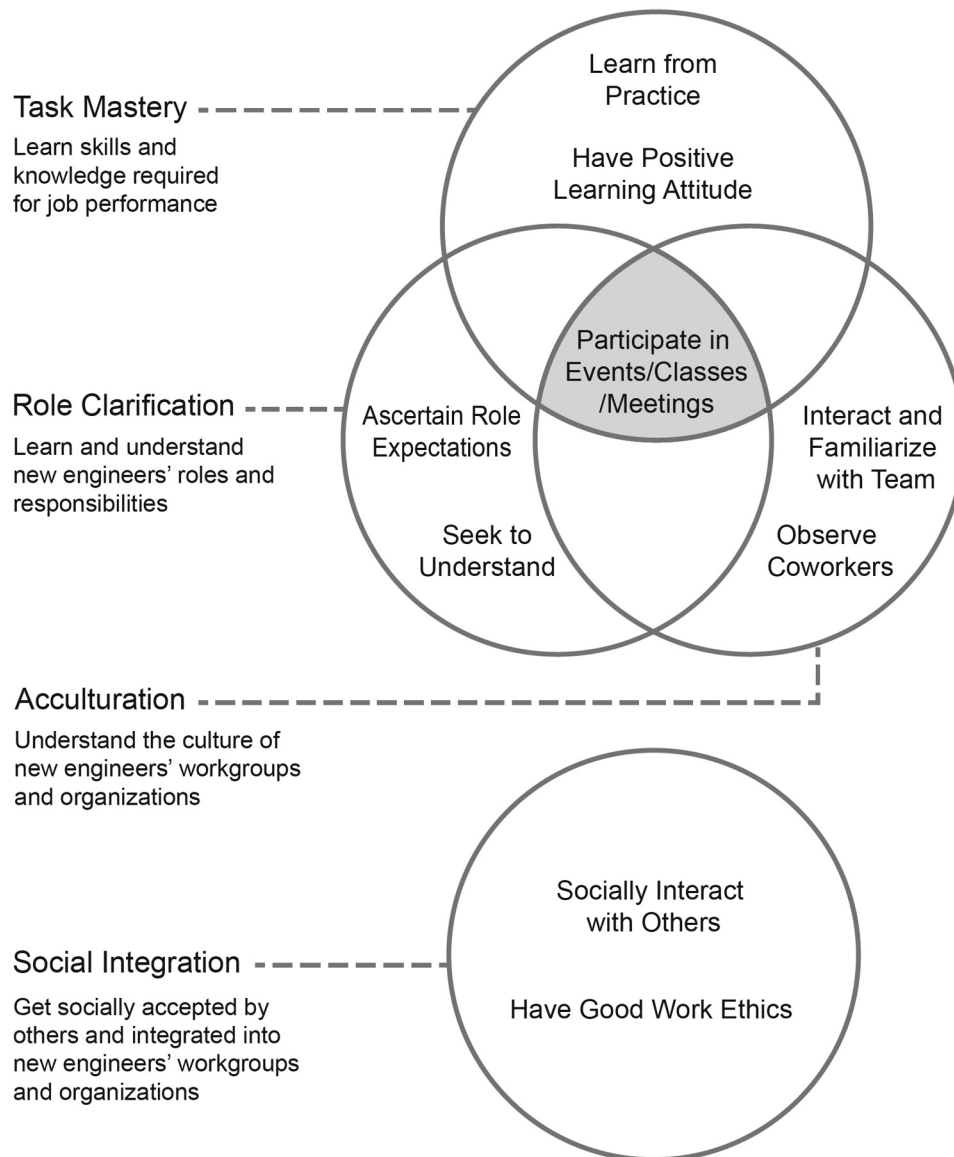
In summary, managers provide learning materials and opportunities, assign mentors, nurture collaboration between new engineers and their coworkers, and assign appropriate

tasks to assist new engineers with acquiring the skills and knowledge needed to complete their job. The managers regularly communicate with new engineers and facilitate coworker interactions to help new engineers understand their roles and responsibilities. In order for new engineers to learn the culture of workgroups and organizations, managers encourage them to observe mentors and join various meetings. Finally, managers create social events and allow time to integrate new engineers into their workplace.

#### *New Engineer Actions from the Managers' Perspective*

We identified several actions new engineers should take during the socialization process from the engineering managers' perspective. Several actions are unique to each socialization domain, while some overlap across the domains, as shown in [Exhibit 4](#).

**Exhibit 4.** Summary of New Engineers' Proactive Steps



*Task mastery domain proactive steps.* The managers identified three actions that new engineers should take to achieve task mastery.

- Learn from practice – New engineers should increase their proficiency in the skills and knowledge required to do their job by practicing and applying them routinely in assigned tasks.

So we do have formal training, but it's more on soft skills for engineers that they can take. But for the technical skills, it really comes down to the on-the-job training they're going to do. (P6\_M\_5–10)

And then the second thing is how do I hone those skills? And, as a new hire, I should appreciate that I do that via doing work to hone that skill or learning from others or getting some coursework on them. (P7\_M\_10–15)

- Have a positive learning attitude – New engineers should have a positive learning attitude at work, such as a willingness to ask questions, learn from others, and gain a deeper understanding of their responsibilities. Furthermore, managers opined that new engineers should stay humble and willing to learn from others.

I would say, 'Come ready to work. Keep your energy high.' Again, be inquisitive, ask good questions. Don't take things for face value. Try to find your passion as fast as possible. (P1\_M\_5–10)

Their success is in paying close attention to what do the successful people around them do, and how are they doing their work. What does their work output look like? (P5\_M\_15–20)

... coming in and understanding that the people that are there have more knowledge than you do .... (P2\_F\_30–35)

- Participate in events/classes/meetings – New engineers should participate in events, meetings, or classes provided by the organization to improve their skills. Managers stated that these events offer opportunities to meet and observe their coworkers and better understand company procedures/norms for the new employees. This action is also identified in the Role Clarification and Acculturation domains.

*Role clarification domain proactive steps.* The managers identified three actions new engineers should take to help them understand their roles and responsibilities.

- Ascertain role expectations – New engineers should communicate with managers and coworkers to discuss position roles and responsibilities, clarify expectations, and seek feedback about their performance.

I would say if there are questions regarding what's expected of you, they should just ask and not be afraid to ask ... Just say, 'Hey, is it expected that I produce a report that goes up to the manager as a result of this?' Or 'Do we just do the calculation and then leave it as is and just give it back to whatever project we're working on?' (P4\_M\_5–10)

It's good to be asking the other members of the team what they think the role of that person is, what support they're providing, and what they're doing and how it impacts the work statement of the team. (P6\_M\_5–10)

- Seek to understand – New engineers should take proactive steps to understand their company procedures, the reasons for the procedures, and their assigned work. Furthermore, new engineers need to enquire with their managers in order to learn how their organization makes decisions. They should also actively seek understanding of the team's norms and the roles of each member.

Again, ask good questions. Really try to observe and understand why things have been done, both strategically and tactically, in terms of decision-making. (P1\_M\_5–10)

To me, it comes back to understanding what the norms of the team are, and not just understanding, but knowing what they are and then working towards fulfilling those, making sure they're doing the things that are culturally viewed as good work. (P5\_M\_15–20)

- Participate in events/classes/meetings – New engineers should actively participate in team meetings or classes to understand how their responsibilities "fit" and "impact" their organizations. Although the same action has been identified in the Task Mastery domain, the purposes for participating in events/classes/meetings are different. In the Role Clarification domain, new engineers are expected to attend team meetings to learn more about how their roles align with their team and organization. However, in the Task Mastery domain, new engineers are expected to participate in events or classes to learn skills and knowledge to perform their job responsibilities.

So yeah, so organizationally we have all-team meetings, and so that's a great way to learn about how they fit into the broader organizational structure and how their work impacts the organization, or their work impacts another organization, so that's kind of one of the primary ways that they could do that. (P6\_M\_5–10)

*Acculturation domain proactive steps.* The managers identified three actions that new engineers can take to achieve acculturation.

- Interact and familiarize with the team – New engineers should frequently interact with senior coworkers and other new engineers to understand the workgroup and organization culture. New engineers should specifically ask for an explanation of the culture and team organization/structure.

And certainly, just talking with other engineers, especially the ones who have been around a while ... So you got to talk to multiple people to kind of understand or have a better understanding of what the company culture is. (P4\_M\_5–10)

And asking your mentor and your leader for an explanation about the culture, too. (P1\_M\_5–10)

- Observe coworkers – New engineers should observe coworkers or managers to learn the culture of the organization.

Observe. I think nothing helps more than just observing the culture ... And observing upper-level leaders is always going to help you understand the culture because you understand how the leaders are thinking and driving the organization. (P1\_M\_5–10)

- Participate in events/classes/meetings – New engineers can participate in project meetings and all-hands-on meetings to better understand the culture of the workgroup and the organization.

Go to the all-hands meetings because that's where they often talk about those kinds of things. (P4\_M\_5–10)

*Social integration domain proactive steps.* According to the managers, new engineers should take the following two actions to integrate with their coworkers:

- Socially interact with others – New engineers should socially interact with coworkers during various social and professional events. New engineers can also actively participate in and initiate social events to expand their network and further develop professional relationships with their coworkers.

It's okay – within limits, obviously – to have conversations with your coworkers that aren't necessarily about work. And a lot of conversations start about work – you talk about the projects that you're working on and then just kind of naturally devolve into talking about your personal life maybe a little better, what's going on in your life at that particular time. (P4\_M\_5–10)

Socially, they need to be participating in activities that their group sets up. If they're not happy with what's happening there, then they ought to set something up. (P2\_F\_30–35)

- Have a good work ethic – New engineers should exhibit a good work ethic to others, such as following through on their responsibilities and commitments. Such efforts will lead to their coworkers accepting them into their team and trusting them.

Well, the first part is meeting their commitments so that their coworkers trust them. You know, professionally. First thing is work's work, and if I'm at work, I'm there for a reason . . . . Be the person who meets their commitments, and their team can count on them and the other stuff will come. The outside work, the social stuff, that all comes. (P5\_M\_15–20)

In summary, new engineers should have positive learning attitudes such as being humble, proactively asking questions, and participating in training or other company events. Additionally, for new engineers to understand their roles and responsibilities, they should communicate with managers and participate in team meetings. Participating in team meetings should also help new engineers learn and understand the culture of the workgroup or organization. Socially interacting with people and working hard to meet their responsibilities and commitments should help new engineers with workgroup/organization integration.

## Discussion

The findings showed the actions managers identify that managers and newly hired engineers should take during the socialization period in order to achieve successful socialization outcomes. This section discusses similarities and differences among the actions identified in previous studies and the current study, and the study's contributions.

## Comparison of Engineering Manager Actions between This Study and Previous Studies

The literature commonly highlights four managers' supportive actions (Baard et al., 2004; Deci et al., 1994; Ellis et al., 2017; Korte et al., 2015; Harris et al., 2020; Korte, 2009): providing information, evaluating newcomers, encouraging self-initiation, and providing a sense of choice. Similar to the action of providing information, as identified by previous studies, this study identified the “providing learning materials or opportunities” action in the Task Mastery domain as an important manager action. This action requires managers to provide information that will develop new engineers' skills and knowledge specific to their job. In this paper, this action is also identified in the Acculturation domain, as it helps new engineers understand their workgroup and the company's culture.

The “evaluating newcomers” action from the literature is related to the “assign appropriate tasks” action in the Task Mastery domain and the “assign mentors” action in the Task Mastery and Acculturation domains. As part of the “assign mentors” action, managers must assess new engineers' abilities and knowledge and determine who can best serve as a mentor. Furthermore, when assigning tasks to new engineers, managers will need to evaluate new engineers' abilities in order to assign appropriate tasks that new engineers can complete.

The “encouraging self-initiation” and “providing a sense of choice” actions are related to the “allow natural integration” action from this study. They require managers to allow new engineers to naturally develop their relationship with coworkers independently, without much intervention from managers. They are also related to the “encourage social events” action, because managers encourage new engineers to attend corporate events to meet and get to know people.

There were some manager actions that were not often seen in previous studies but were prominent in this study. One of the actions is to “communicate regularly with new engineers” in the Role Clarity domain. Even though previous studies (e.g., Ellis et al., 2017; Korte, 2009) have mentioned the importance of managers' guidance to new engineers, not much attention was paid to how managers can help new engineers understand their roles and responsibilities through frequent communication. In this study, the research team found that communication between managers and new engineers is critical to understanding how new engineers feel and to allow them to gain a sense of belonging to their workgroups and organizations. Furthermore, managers evaluate new engineers' understanding of their roles and responsibilities through frequent communication and discussions of job descriptions.

Moreover, this study identified two new supportive actions regarding the interaction between new engineers and their coworkers: “encourage workgroup collaboration” in the Task Mastery domain and “facilitate coworker interaction” in the Role Clarification domain. These actions emphasize the important role that managers have in encouraging interactions between new engineers and their coworkers. Providing such interaction opportunities will ensure that new engineers learn important skills and knowledge from their coworkers and become familiar with their job responsibilities.

“Review new engineers' behaviors” is another new action identified in this study, whereby managers help new engineers achieve social integration into their workplace. This action includes managers reviewing new engineers' social behaviors and making sure they portray professional behaviors that will lead to workgroup

integration. It also encompasses the need for managers to look out for new engineers, ensuring they are included in social events, and protecting them from any unexpected social situation. This supportive action requires managers to pay attention to new engineers' networking, develop relationship processes with others, and intervene when necessary.

#### *Comparison of New Engineers' Actions between This Study and Previous Studies*

As highlighted in the literature review section, seven proactive behaviors of new employees are often mentioned in newcomer socialization studies (e.g., Ashford & Black, 1996; Saks et al., 2011): information seeking, feedback seeking, general socializing, relationship building, networking, positive framing, and negotiating job changes.

When comparing this study's findings with these previously found behaviors, there are some similarities. For example, certain actions identified from this study, such as "have a positive learning attitude," "ascertain role expectations," "seek to understand," and "interact and familiarize with the team" are related to information seeking and feedback seeking from previous studies. Also, the "socially interact with others" action in the Social Integration domain is similar to previously found behaviors such as general socializing, relationship building, and networking.

Furthermore, previous studies (e.g., Cooper-Thomas et al., 2012; Korte, 2009), as well as this study, show that new engineers can understand their roles and responsibilities as well as the culture of the workgroup and the organization through working well with coworkers. Moreover, new engineers learning required skills and knowledge through completing real tasks (i.e., the "learn from practice" action) is also seen in previous studies (e.g., Cooper-Thomas et al., 2012; Korte et al., 2015) as well as in this study.

Previous studies did not often mention the "have a good work ethic" action in the Social Integration domain, as identified in this study. Compared with socially related proactive behaviors identified in earlier studies (e.g., general socializing, networking, and relationship building), managers from this study identified maintaining professionalism at work as one of the most important ways of obtaining trust and being socially accepted.

Finally, this study did not find negotiation of job changes as one of the new engineers' actions. This result may reflect the phenomenon that managers may not think about negotiating new engineers' job changes as much as new engineers do. Managers' main goal in communicating with new engineers is to know what new engineers understand and how they feel about their positions.

The likely reason for some of these additions and differences between the findings of this study and those of previous studies is the studied participants. The previous proactive behaviors identified by the literature were mostly based on newcomers' perspectives (e.g., Ashford & Black, 1996; Cooper-Thomas et al., 2012; Saks et al., 2011; Wingerter & Ahn, 2020), while research findings in this study were identified from managers' opinions. The variation between the two participant groups may have led to the differences in identified actions for new employees.

Overall, this work revealed the importance of new engineers building trust and developing good relationships with others by working hard and meeting their work commitments during the socialization period.

#### **Implications of Engineering Managers**

Engineering managers have various roles and responsibilities, including helping newly hired engineers successfully transition to their organizations and teams (Ellis et al., 2017; Korte et al., 2015). Undoubtedly, engineering managers desire their newly hired engineers to become acquainted and contribute to their teams and organizations quickly. Engineering managers' actions in the socialization period can play a critical role in the success of new engineers' transition (Ellis et al., 2017). Given that many engineering managers personally experienced the challenges of being a newly employed engineer and have previously worked with other newly hired engineers, they will have their own set of practices and actions to apply. However, there may be practices and activities they have overlooked or have not considered. Hence, this paper contributes to presenting the measures that engineering managers have applied, which can help current and new managers interact with new employees during the socialization period. The identified actions in this study are what the participants believed would help new engineers. An engineering manager can apply the results of this paper throughout their tenure when working with newly hired engineers. In its contribution to the engineering managers, this paper shows:

1. The identification of engineering manager actions according to the four key socialization domains in Morrison's framework. The actions identified in this study show what engineering managers did to ensure that new engineers (1) master the required skills and acquire knowledge to perform their job responsibilities, (2) understand their roles and responsibilities of their assigned positions, (3) understand the culture of workgroups and organizations, and (4) socially integrate with their peers/colleagues. The identified engineering manager actions are tied explicitly to helping new engineers achieve these four socialization outcomes/domains. Engineering managers can use the results of the paper to become familiar with what other engineering managers do and compare their actions with the identified actions. They can apply the specified measures or adapt actions according to their organizations' and new employees' needs, and help their new members come on board.
2. The identification of newly hired engineering employee actions from the perspective of engineering managers. These actions by newly hired engineers, again sorted by four key socialization domains, are just as important as engineering managers' actions. The steps provide new engineers with understanding of managers' expectations regarding how they should act during the socialization period. Current and new engineering managers can share these actions with their new engineers and encourage them to practice them. Sharing these actions ensures a successful socialization process, which is the responsibility of engineering managers and new engineers. Performing these actions provides better collaborations and relationships between new engineers and their managers during the socialization process.
3. Morrison's framework and the applied qualitative research method effectively captured actions according to key socialization domains. Engineering managers may desire to build on the identified efforts by exploring additional measures suitable for their organizations and applying approaches similar to qualitative study with interviews, as



used in this study. Using the interview protocol in the Appendix, engineering managers may explore additional actions specific to their organizations or begin to investigate acts of other individuals (e.g., senior engineers, peers/colleagues, team leads) with whom new engineers often interact during the socialization period. This effort will continue to ensure that the engineering managers' organizations and teams have a set of actions for all stakeholders, supporting the successful onboarding of new engineers.

### Limitations and Future Studies

One of the limitations of this study is that it does not offer information on whether the identified actions predict new engineers' successful socialization outcomes (e.g., job performance, satisfaction, and retention). Although the specified actions are obtained from engineering managers who have had multiple years of managing and working with new engineers, the research team cannot claim, without further investigation, that performing these actions will lead to successful new engineer outcomes. These findings were from a qualitative research study aimed at identifying actions rather than associating them with specific outcomes. Future studies can extend the current research and examine the association between the actions and new engineer outcomes.

Another limitation is that the research team has identified the actions of new engineers from managers' perspectives. It might be fruitful to ask new engineers what they think of these manager-suggested actions and what challenges they might encounter when completing these actions. There could be factors that hinder new engineers from taking the actions and that managers should address.

The small sample size and the very specific type of company for which the participants work is another limitation of this study. There were only seven participants, of which only one was female. Furthermore, all of the participants are working at A&D companies that are well established across the nation and globe. Future studies could include a demographically diverse group of managers and participants from more recently established A&D companies and compare how socialization actions differ between different groups of managers from different types of companies. Other actions may exist that would benefit diverse groups of people and types of companies.

### Conclusion

Interviewing seven engineering managers from A&D organizations, the research team explored the managers' supportive actions and new engineers' proactive steps that help new engineers during the socialization period. The research team identified the actions according to four socialization domains: Task Mastery, Role Clarification, Acculturation, and Social Integration. The study findings expand the literature examining managers' roles in new employees' socialization process, as well as new engineers' actions. The study revealed various actions that managers and new engineers should take in order for new engineers to successfully acquire skills, understand the organizational culture and their role responsibilities, and integrate into their workgroup and organization. The findings can benefit aerospace engineering educators, managers, engineering students, and newly hired engineers. Future research can explore how these actions affect various socialization outcomes for new engineers.

### Acknowledgements

This material is based upon work supported by the National Science Foundation under Grant No. EEC #1826388. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

### Disclosure Statement

No potential conflict of interest was reported by the authors.

### Funding

This work was supported by the National Science Foundation under grant number EEC-1826388. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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## Appendix

A portion of the manager interview protocol

1. In your opinion, what is the most important action that new-hire engineers should take to adjust to working in a new organization?
2. In your opinion, what is the most important action that a manager should take to help newly-hired engineers adjust to working in a new organization?
3. What can a manager do to help a new engineer learn and master the skills required to perform his or her job?
4. What can a manager do to help a new engineer learn and understand their role (i.e., position) expectations and responsibilities?
5. What can a manager do to help a new engineer learn, understand, and accept their workgroup's (or the company's) culture and work environment?
6. What can a manager do to help a new engineer socially become accepted into the work group and to get to know his or her coworkers?