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Defining Antecedents for Noncommissioned Officer Self-Learning: A Review of the Literature

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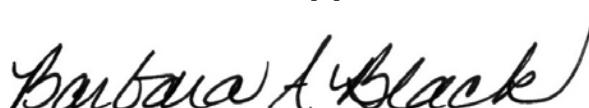
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14.ABSTRACT (*Maximum 200 words*):

We reviewed the scientific literature on self-directed learning, self-regulation of learning, motivation for self-learning, and organizational supports for self-directed learning. Findings based on the review were set in the context of the Army Learning Model 2015 (Army Learning Concept 2015). Recommendations were made concerning organizational and training support for the development and enhancement of self-directed learning skills, with a focus on developing enlisted Soldiers and Army NCOs. Various techniques and approaches are proposed concerning measurement of self-learning and the acquisition of self-learning skills within the Army NCO Corps.

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iii

DEFINING ANTECEDENTS FOR NONCOMMISSIONED OFFICER SELF-LEARNING: A REVIEW OF THE LITERATURE

EXECUTIVE SUMMARY

Research Requirement:

In partnership with the Institute for Noncommissioned Officer Professional Development (INCOPD), researchers from the Army Research Institute (ARI), Personnel Decisions Research Institute, Inc., and Colorado State University undertook a research effort to explore critical self-learning events in the careers of Army Noncommissioned Officers (NCO) as well as the self-learning strategies that NCOs apply when learning on their own for their Army jobs. This review of the scientific literature on self-learning emphasizes the individual knowledge, skills, abilities, and other characteristics (KSAOs) that scientific research has suggested support self-learning processes. It also covers the institutional and organizational factors that may influence self-learning opportunities and that support individual development.

Self-learning skills are essential in the Army's evolving training and professional development environment. The Army Learning Concept 2015 (ALC 2015) presents a clear mandate for change in the Army's instructional philosophy and training practices. It emphasizes a facilitative and learner-centered training model as well as a view of professional development that is guided by the individual, with support provided by Army training institutions, mentors, and online resources. This emerging emphasis in Army training will inevitably increase the responsibility Army Noncommissioned Officers (NCOs) and enlisted Soldiers take for their learning and professional development. With increased independence also comes an increased need for NCOs and Soldiers to possess effective self-learning skills, skills that will support their life-long learning efforts. Further, for NCOs, effective self-learning skills may help in facilitating the learning activities of the Army personnel they mentor and train.

Method:

This review of the literature examines existing theories and empirical findings to identify KSAOs related to self-learning, also referred to as self-directed learning. We identified research related to defining self-learning, identifying key self-learning skills, and determining individual and organizational factors that influence how an individual becomes motivated to engage in self-directed learning activities. We then sought to contextualize the scientific understanding of self-learning within the ALC 2015 learning model, specifically looking at skills and strategies to support the Army NCO Corps and enlisted Soldiers who are working toward NCO leadership positions in the Army.

We investigated individual KSAOs that influence self-learning, operating from the basic premise that successful self-learning depends on the relevant skills an individual has and their motivation to accomplish self-learning, as well as the organizational factors that influence the development and maintenance of these skills and motivation (Boyce, Zaccaro, & Wisecarver, 2010). In the report, we first define self-learning, and then we identify the key self-learning skills for enlisted Soldiers and NCOs. Following this, we consider the individual traits, attitudes, and belief systems that may affect whether Soldiers and NCOs feel motivated to engage in self-

directed learning activities. We then describe the Army's potential organizational role in supporting factors that contribute to successful self-learning.

Findings:

Existing research indicated that to be successful self-learners, Soldiers and NCOs should master a varied set of self-regulatory skills and maintain an attitude of personal responsibility for learning a wide range of skills that can be utilized prior to, during, and following the self-directed learning experiences. They should be self-aware of how they learn as they proceed through the self-development process, and be able to evaluate critically their learning at all stages. Although individual learners must be mainly responsible for acquiring and executing these self-regulatory processes, organizations can assist in this process by (1) providing insight into the competencies that should be developed, (2) assisting with motivational assessment and identifying resources, and (3) providing feedback throughout the learning process about initial knowledge gaps, the effectiveness of strategy selection, and whether learning has had the intended effect on improving the targeted competencies.

Regarding motivation to engage in self-directed learning, individuals and organizations both have important roles in helping employees acquire and maintain the motivation to be continuous learners. Research suggests that the motivation to become a continuous life-long learner stems from a wide set of individual traits, beliefs and attitudes. These include self-efficacy, learning orientation, conscientiousness, openness to experience, career motivation, job involvement, perceived benefits of self-development, and a wide set of organizational characteristics, such as organization-wide support for self-development, the provision of accurate and timely feedback about self-development efforts, and rewards for self-directed learning activity.

The antecedents of motivation to self-develop appear to vary considerably in the degree to which they can be modified through individual or organizational action. At one extreme, individual traits such as conscientiousness, openness to experience, or a proactive personality may be very difficult to change through an individual or organizational intervention. At the other extreme, individual beliefs and attitudes about learning, and organizational characteristics, can all be modified to a large degree through either individual or organizational action. In the middle of this continuum, characteristics such as self-efficacy and learning orientation, though difficult to change, can still be influenced by individual and organizational action.

Utilization and Dissemination of Findings:

This technical review of the literature is the first of three reports resulting from this research effort, and is intended for a technical audience as well as decision-makers and NCOs who are interested in the science behind self-learning/self-directed learning. The research report and research note to follow this publication concern our findings from our research with Army NCOs, as well as a set of storyboards for an e-Handbook of Self-Learning Strategies we developed, specifically focused on Army NCOs.

The results provide a conceptual foundation for the support of research and other initiatives concerning self-directed learning among Army Soldiers and NCOs. This review of literature supported our efforts to develop an NCO specific self-learning strategies assessment tool and to draft set of training modules that may be used by leaders to evaluate their own and

others approaches to self-learning as well as to build knowledge and skills in this area within the Army NCO Corps. Recommendations based on this review and related research was briefed to the TRADOC Institute for Noncommissioned Officer Professional Development in September 2011.

DEFINING ANTECEDENTS FOR NONCOMMISSIONED OFFICER SELF-LEARNING: A REVIEW OF THE LITERATURE

CONTENTS

CONTENTS (continued)

LIST OF FIGURES

DEFINING ANTECEDENTS FOR NONCOMMISSIONED OFFICER SELF-LEARNING: A REVIEW OF THE LITERATURE

Introduction

Self-learning, or self-directed learning, concerns what individuals do on their own to acquire and hone new knowledge and skills. Within the profession of arms, self-learning skills are essential to keeping up with changing mission and job requirements. By developing self-learning skills in Noncommissioned Officers (NCO) and enlisted Soldiers who are becoming NCOs, the Army can further support its initiatives in adult education, life-long learning, and professional development.

In early 2011, the Army Training and Doctrine Command (TRADOC) published the Army Learning Concept 2015 (ALC 2015; TRADOC Pam 525-8-2, 20 January 2011). ALC 2015 has introduced many new concepts into the Army's core philosophy of training, education, and professional development. It describes how the Army learning environment will be reshaped for initial military training (IMT) and professional military education (PME), preparing for the future education system of Soldiers, Noncommissioned Officers, Warrant Officers, and Commissioned Officers (U.S. Army, 2011). Moreover, ALC 2015 describes a system that will function as a learning continuum, blending self-development with institutional instruction and operational experiences. ALC 2015 emphasizes the following ideas:

- Learner-centric as opposed to instructor-centric materials and timelines
- Point-of-need access to learning rather than place-dependent access
- Mechanisms to adapt to periods when learning time is constrained or is not constrained
- Capability to allow inventiveness, learner-created content, and the input of learner knowledge
- Feedback and support from peers and mentors
- Learner assessments that permit failure and remediation
- Tailored learning based on results of a pretest assessment
- A blended learning approach that includes technology-delivered instruction such as games, scenarios and simulations

As Army learning becomes more fluid, tailored, and learner-centric, NCOs will need to develop their capability to engage successfully in this learning context, directing and evaluating their own learning activities. NCOs must be prepared to take charge of their own development, and to update their knowledge and skills as necessary. They will do this through continuous self-directed learning. It is therefore critically important to understand the organizational systems and individual knowledge, skills, abilities, and other characteristics (KSAOs) that influence success in self-learning.

This report provides an overview of the scientific literature concerning individual KSAOs that may impact self-learning, operating from the basic premise that success in self-learning depends on an individual having the relevant skills and motivation to engage in self-learning as

well as an optimal organizational learning environment to support self-learning (Boyce, Zaccaro, & Wisecarver, 2010). The review is structured in the following way:

- First, we define self-learning, covering the major concepts and theories about self-learning and self-directed learning.
- Second, we identify the key self-learning skills for Soldiers, and consider the individual traits, attitudes, and belief systems that may affect their motivation to engage in self-directed learning activities.
- Third, we describe how organizations play a role in supporting these factors, and discuss implications for training Soldiers and NCOs to excel at self-learning.
- Finally, we discuss ways ahead and make recommendations concerning ways to assess and train self-learning skills in the Army.

Defining Self-Learning

The activities surrounding learning on one's own have been described in a variety of ways, including self-learning, self-directed learning (e.g., Knowles, 1975), self-development (e.g., Boyce et al., 2010), and lifelong learning (e.g., Kraiger & Wolfson, 2011). In the scientific literature, self-learning and self-directed learning typically have a very similar meaning; they refer to a process of learning how to self-manage, or self-regulate, one's development (Adams, 2007; Garrison, 1997; Zimmerman, 1989). According to Knowles (1975), self-directed learning is:

A process in which individuals take the initiative, with or without the help of others, to diagnose their learning needs, formulate learning goals, identify human and material resources for learning, choose and implement appropriate learning strategies, and evaluate learning outcomes (p.18).

The concept of self-development diverges somewhat from that of self-learning and self-directed learning. Boyce et al. (2010) have argued that self-development is a broader concept, as it refers to a how an individual builds a deeper understanding of his or her environment and self. Beyond the knowledge and skill development that is achieved in self-learning, self-development focuses on how an individual can sustain growth in a given domain and continue to increase the complexity of how he or she is able to make sense of the domain. Self-development also differs from the concept of lifelong learning. Lifelong learning refers to "an individual's continued education beyond school or formal training programs" (Kraiger & Wolfson, 2011). Kraiger and Wolfson (2011) indicate that lifelong learning is often self-directed and informal, but it does not have to be. Self-learning or self-directed learning is one type of lifelong learning, the overarching concept of lifelong learning also including other types of directed learning activities.

While the concept of lifelong learning is well suited to the NCOES concept of combined self-directed and other-directed learning which spans an Army career, our current focus is specifically on identifying KSAOs that are relevant to the basic self-learning process. Therefore, we will adopt the term *self-directed learning* as defined by Knowles (1975). Here, we will also

consider the terms self-learning and self-directed learning as interchangeable, tending to favor self-directed learning due to its more frequent use in the literature.

It is important to note in this definition that the individual is *directing* the learning, but this does not mean that he or she is learning everything on his or her own; that is, one can take a course on public speaking as part of a self-directed curriculum to become a better Army instructor, or one can take the same course as part of a college curriculum because it is required for a particular degree program. What seems to set each case of learning apart from the other is the motive and rationale of the learner, and the degree of autonomy he or she perceives having in pursuing his or her learning decisions and goals.

Using the Knowles' definition as a guide, a number of key competency areas are identified directly in how the self-directed learning concept is defined: taking initiative, diagnosing learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing learning strategies, and evaluating learning outcomes. These can be organized into two fundamental components: (a) self-regulatory competencies and (b) motivation to engage in self-directed learning. We will first review the scientific literature regarding the self-regulation process, and then we will examine the literature on characteristics related to how individuals are motivated to self-learn.

Skills Required for Self-Learning

According to a well-respected model of self-regulated learning (cf. Zimmerman, 1989), self-regulation is not a static mental ability, but a self-directed process by which learners transform their mental abilities into academic skills.[1] The key point is that self-regulation of learning involves a set of skills that can be *learned* (London & Smither, 1999). Zimmerman (1989) describes three distinct phases in how learning is self-regulated: (a) a forethought phase, which includes self-regulatory processes and beliefs that occur prior to learning, (b) a performance phase, which includes those processes and beliefs that occur during the learning process, and (c) a self-reflection phase, which includes those processes and beliefs that occur after learning has taken place. This is a useful framework for considering the key self-regulatory processes required for self-directed learning, examining key skills related to each of the three phases:

- Phase I: Pre-learning self-regulatory processes
- Phase II: Selecting and applying learning strategies
- Phase III: Post-learning self-regulatory processes.

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[1] It should be noted that in the self-directed learning literature, the terms "self-management" and "self-regulation" of learning processes are often used interchangeably. These two terms have different origins: self-management is a term used primarily by adult education researchers; self-regulation is a term used by psychologists. For present purposes, both constructs are interchangeable because they deal with essentially the same processes that adult learners use to regulate their self-directed learning. We have chosen to use the term self-regulation to describe the key set of self-management and self-regulation processes required for self-directed learning.

While reviewing the skills important to these phases, we will expand on this model to include unique insights from the self-management literature.

Phase I: Pre-Learning Self-Regulatory Processes

According to the model of self-regulated learning developed by Zimmerman (1989), the forethought phase of self-directed learning includes two steps: (a) an examination of one's readiness for learning, and (b) a task analysis. In determining whether one is ready to engage in learning, the individual examines some key personal traits, beliefs, and/or attitudes that may affect his or her ability and/or motivation to learn independently. Further, he or she attempts to resolve identified issues prior to beginning the learning process. Self-examination includes careful study of a set of self-motivational beliefs, such as self-efficacy for learning, goal orientation, outcome expectations for learning, and intrinsic interest in the material to be learned, that may interfere with the learning process. These motivational attributes will be discussed in the section of the report titled *Motivation to Engage in Self-learning*; however, it is important to note that skill at engaging in self-reflection about these traits, beliefs, and attitudes can impact the self-learner's capability to appropriately prepare to learn.

In addition to considering one's readiness to learn, another fundamental question a learner must ask is: What should I learn (Ellinger, 2004)? Within an organization, employees may be motivated to develop, but may not always have accurate insight into the types of knowledge and skills the organization perceives to be the most useful. For self-directed learning in the Army, Soldiers must be able to identify the key current and future competencies they need to learn and develop, whether the competencies concern a specific job or specialty area, or concern their career development as an NCO and leader in the Army.

To assess readiness to learn, an individual must consider his or her current level of knowledge and skill in a given domain. In this step, a Soldier or NCO would diagnose his or her learning needs by identifying gaps between his or her current knowledge and skills and the level of knowledge and skills he or she desires (Knowles, 1975; Patterson, Crooks, & Lunyk-Child, 2002). Determining the gaps in knowledge and skills is crucial because it provides a basis for subsequent learning decisions. For instance, junior leaders seeking to develop their leadership skills need to make an accurate assessment of their strengths and weaknesses to determine if they should focus on developing an area such as interpersonal skills, or influence tactics, or perhaps adaptive decision-making. To succeed in this process, learners need to (1) identify the relevant competency dimensions, and then (2) determine their capability on each dimension. In some cases the required competencies may be clear; for example, the ALC 2015 provides a description of the competencies required for success as an NCO leader in the Army. In other cases, such as starting a new job in a fluid and changing environment, it may be a challenge just to define the key activities and associated competencies.

Organizations can help employees understand their learning gaps by ensuring the job requirements are clear. Learning gaps can also be identified by using some kind of multisource feedback process, such as a 360-degree feedback tool (Kraiger & Wolfson, 2011). When a formal feedback process does not exist, however, Soldiers and NCOs can still obtain feedback from supervisors and coworkers about areas they could improve. Once the required

competencies and learning gaps have been identified, the prospective learner must set goals for the learning process and begin to think strategically about which learning strategies will be optimal given his or her unique learning style.

Phase II: Selecting Learning Strategies

As learners begin to learn about an unfamiliar domain, they move from the preparation phase to the performance phase of self-regulated development (Zimmerman, 1989). In this phase, learners must self-regulate their learning activities in such a manner that they give themselves the best chance to learn from the materials or other educational experiences they have selected, and to meet their specific learning objectives. In this phase, learners need to focus on how they *select* specific strategies to facilitate knowledge and skill acquisition during the learning process (Zimmerman, 1989). There are a variety of self-regulated learning strategies that can be used to facilitate learning. These can be organized into four key categories: self-control strategies, task-based strategies, self-monitoring of learning, and self-modifying strategies.

Self-Control Strategies

Self-control strategies are one of the most important classes of strategies and include such processes as (1) seeking information, (2) self-instruction, (3) imagery, (4) attention-focusing, (5) goal-setting, and (6) seeking social support (Zimmerman, 1989). Together, these self-control strategies help learners focus on tasks and maximize returns on effort expended. In seeking information, learners make efforts to secure as much information about course assignments and objectives as possible in advance of course commencement. For instance, before beginning an ambiguous assignment, a learner may go to the instructor to clarify the objectives of the assignment. By clarifying objectives beforehand, the learner can then focus their effort on what they perceive to be the essential aspects of their assignment. This same process emerges in self-directed learning when an individual identifies what he or she hopes to do as a result of his or her learning activities.

In self-instruction, the learner verbalizes how to succeed while performing a task. For example, if an NCO is learning how to negotiate effectively with an Afghan tribal elder, he might say to himself: 'First I need to try to understand where the elder is coming from and what his interests are, then I will share with him our key goals, then we will work to find a solution that effectively satisfies each of our most important interests.' Such verbalizing has been shown to improve learning (Schunk, 1982). In fact, reading aloud is a verbalizing technique as common to young children as it is to adults with advanced degrees—it forces the reader to slow down and process difficult information in greater depth by both hearing and seeing the text being read (Rayner & Pollatsek, 1995).

Using imagery to form mental pictures also has been shown to improve encoding and performance. For example, a learner who imagines successfully performing a difficult skill, such as negotiation, is more likely to succeed than one who does not (Garfield & Bennett, 1985). Learning how to focus one's attention is also important because it increases the length of time a learner can concentrate on the material being learned. One of the key strategies for increasing

attention during learning is environmental structuring, where one carefully chooses one's learning environment to minimize distractions (Kuhl, 1985; Weinstein, Schulte, & Palmer, 1987). As an example, a learner may make a conscious decision to eliminate distractions by studying alone. Related to environmental structuring, there is also research to suggest that when learners change their setting while they are learning (e.g., studying learning material in two different rooms rather than twice in the same room), what they are learning is more likely to be retained (Smith, Glenberg, & Bjork, 1978).

Another important self-control strategy is knowing how to set goals. Once learners are immersed in a course, they will optimize their chances for learning by setting specific learning goals throughout the course. Learners who set specific, difficult, and achievable goals exhibit superior effort, investment, and performance compared to learners who simply make a commitment to do their best (Locke & Latham, 1990). This is because goals direct learners' attention, help maintain persistence, and facilitate the development of a plan for when, where, and how particular performance levels will be reached (Locke & Latham, 2002). Finally, in seeking social support, learners talk to peers, supervisors, or others to discuss how a task might be approached, or to help overcome other obstacles. Perceptions of social support from managers and peers influence self-development activity (Birdi, Allen, & Warr, 1997; Noe & Wilk, 1993), so it is important for mentors, trainers, and supervisors to actively encourage self-directed learners by inquiring how learning is progressing and by being available to provide advice about learning strategies and completing specific assignments.

Task-Based Strategies

Often, when learning new material, an individual will take notes, create study aids (e.g., note cards), draw diagrams, imagine situations in which they are using what they have learned, etc. These are task-based strategies. Task-based strategies assist learning by allowing learners to extract essential elements and reorganize the parts. This type of reorganizing strategy is fundamental to the creative/adaptive processes as well as to learning (cf. Wertheimer, 1945). One very important task-based strategy involves elaborating and transforming the learning material to make it personally meaningful. For instance, an NCO could increase his or her chance of retaining a set of negotiation principles by attempting to figure out how those principles could be applied to a work-related situation he or she may one day face, such as a negotiation with a village elder. By actively elaborating and transforming the material to be learned, learners increase the cognitive load they place on themselves, as well as the depth of processing required to understand the material. Greater depth of processing of information, in turn, leads to better encoding of information, and has been shown to produce better recall (Craik & Lockhart, 1972).

Other important task-based strategies involve note-taking, reviewing notes in preparation for tests, and rehearsing and memorizing (Zimmerman, 1989). With all of these strategies, the goal is to transform what is given by the course into a set of materials that are personally meaningful. This transformation process is what increases investment in the material, and enhances encoding, retention, and retrieval. Finally, deliberate practice is a key task-based strategy for learning skills specifically. There is no better way to increase engagement with the material to be learned than through extensive practice. Deliberate, guided practice is one of the

chief determinants of high performance of any skill (Ericsson & Charness, 1994; Ericsson & Smith, 1991), and has been effective for training adaptive battlefield thinking for Army officers (e.g., Shadrick, Crabb, Lussier, & Burke, 2007).

Self-Monitoring Learning

A third set of self-regulatory processes in the performance phase involves self-monitoring one's learning. Self-monitoring learning involves tracking and evaluating progress toward learning goals, and seeking feedback using self-evaluation criteria, peer-evaluation criteria, tests, or even self-recordings of learning progress. Learners can track progress in learning by self-evaluating the quality of their assignments before turning them in. For instance, a learner could check over her work to make sure it was done correctly (Zimmerman, 1989).

It is important to note that while self-evaluating can be useful for incorporating self-awareness into the learning process, there is considerable research to suggest that people tend to have flawed self-assessments. That is, they evaluate their performance more positively compared to objective measures (e.g., Dunning, Heath, & Suls, 2004). In fact, the relationship between individuals' self-assessments and their actual performance is generally weak to modest. People overestimate their abilities by overlooking their weaknesses and/or conceptualizing good performance in such a way that they evaluate their performance optimally (e.g., Dunning et al., 2004). For this reason, it is crucial that individuals receive feedback from others or measure their learning in objective ways so that they can gain a more accurate picture of their progress toward learning goals and so they can regulate their behavior more effectively. For example, by examining test results, learners can determine how much they have actually learned using the strategies they have selected. Alternatively, a learner can track progress by recording evidence of the consequences of using certain learning strategies. By connecting strategies to outcomes, a learner may discover that she has better recall of material when he or she studies on her own as opposed to studying in a group setting. This information can then be used to adapt how he or she structures her learning environment.

While it is important for learners to use whatever subjective and objective measurements of learning that may be available to them in order to ensure material is being learned, for many learners, the most important feedback they receive comes from leaders and mentors in their organization. In fact, there is evidence that feedback from supervisors is more highly related to performance than that of any other source (Becker & Klimoski, 1989). These leaders can provide crucial information about whether the material learned in self-directed learning efforts is improving on-the-job performance for the targeted organizational competencies. While it is up to learners to seek out feedback from organizational leaders, organizations can facilitate the process by using feedback tools, such as multisource 360-degree feedback (Kraiger & Wolfson, 2011). Ideally, such feedback systems will be implemented as part of a continual learning process, when results are used to set developmental goals, which in turn drive participation in learning activities, which eventually lead to changes in behavior and performance.

Appropriate feedback about employee learning has a number of positive effects. Feedback enhances learning, keeps goal-directed behavior on target, increases motivation to set higher goals, increases employees' ability to detect errors on their own, and increases the amount

of control employees feel (Ilgen, Fisher, & Taylor, 1979; London & Mone, 1999). To be the most useful, however, feedback should be provided as close as possible (temporally) to the actual behavior, it should focus on behavior that is under the control of the learner, and it should be communicated frequently (Cascio & Aguinis, 2010). We will revisit the importance of feedback when we discuss the effect of feedback on motivation to self-learn.

Self-Modifying Strategies

Self-modifying strategies are a final set of key self-regulatory learning processes related to the performance phase. Based on the feedback received from themselves, instructors, and their organization, learners detect factors that have been hindering learning, and adjust their learning strategies as appropriate in light of the feedback they receive (Knowles, 1975; Patterson, Crooks, & Lunyk-Child, 2002; Purdie, Hattie, & Douglas, 1996; Sessa & London, 2006). This self-correction process may involve adjusting learning strategies, repairing motivational deficits, or even changing courses if it is determined the present course is not leading to the desired learning outcomes.

The empirical evidence suggests that the performance-based self-regulated learning strategies covered in this review, when used in combination, have a profound effect on learning. For instance, Zimmerman and Martinez-Pons (1986; 1988) found that 14 key self-regulated learning strategies during the performance phase accounted for 93% of the variance in high school students' achievement-track placement in school. In addition, they found 13 of the 14 strategies discriminated significantly between students in the upper achievement track and students from lower tracks. This included strategies such as keeping records, rehearsing, memorizing, seeking information, and seeking peer, teacher, or adult assistance. These results strongly indicate how important it is for learners and organizations to take strong action to learn self-regulated learning skills. It is also critical for learners to learn the metacognitive skills that allow them to apply any of the strategies when needed. As all of these self-regulated learning strategies make clear, metacognitive skill, or awareness of one's own mental processes, is critical for successfully implementing the learning strategies. In brief, self-directed learners are self-aware. They analyze and think critically about themselves, their learning goals, what is or is not working, and why. They then take positive steps to change any strategies that are not working. Research has demonstrated that such metacognitive activity is a key determinant of motivation to engage in self-directed learning (Boyce et al., 2010).10

Phase III: Post-Learning Self-Regulatory Processes

Following learning, learners enter a self-reflection phase (Zimmerman, 1989). In this phase, they engage in self-judgment and self-evaluation. Self-judgment involves evaluating one's performance and attributing causal significance to the results. Self-evaluation involves comparing learning results with a standard or goal (Zimmerman, 1989). In the self-judgment phase, learners make attributions for their learning successes or failures which play a pivotal role in determining motivation for future learning. For instance, learners who make dispositional attributions for failures will be less motivated to engage in future learning, while learners who make dispositional attributions for success will be more motivated to engage in future learning (Weiner, 1979). Similarly, when learners attribute failures to environmental factors, such as

poor strategy selection, this may not affect subsequent motivation to learn but may prompt them to select a different set of strategies next time. Whenever possible, organizational mentors should encourage learners to attribute learning successes and failures to strategy selection, not learning ability.

Learners' can self-evaluate the learning process in different ways. For instance, they can assess whether they achieved all of the learning goals that they set for themselves at the beginning of learning, or they can assess how they performed in relation to others. As comparisons with others tend to emphasize negative aspects of learning rather than positive ones, learners should learn to de-emphasize normative comparisons, and focus on whether learning goals have been met (Zimmerman, 2000). Perhaps the most useful self-evaluation will be a comparison of current performance with earlier levels of one's behavior. Such an assessment can be facilitated by an organization's multisource feedback process. In making such before-and-after comparisons, it is important that enough time has passed since the initial assessment that learners have the ability to demonstrate the newly learned knowledge on the job. To motivate learners for future self-development activity, it will also be important for supervisors and managers to emphasize areas where learners have developed. Breidert and Fite (2009) have noted the importance of using specific and measureable goals to provide a clear-cut way for individuals to determine what and how well they have learned, as this method of self-assessment is less susceptible to overconfidence biases. Establishing clear goals for a self-learning project seems to provide benefit in both guiding the project and in evaluating the outcomes, allowing the learner to target areas for additional effort.

Summary

To be successful self-learners, Soldiers and NCOs need to master a varied set of self-regulatory skills throughout the entire learning process. This includes skills executed in preparation for learning, during learning, and following learning. Before we proceed to examine motivational aspects, there is one side note to mention. While we are particularly interested in understanding trainable skills for self-learning as opposed to more static abilities, it is worthwhile to mention the potential role of cognitive ability in the self-regulatory learning processes (Noe & Wilk, 1993).

General cognitive ability predicts learning from elementary school to high school to college (Gottfredson, 1997; Ree & Carretta, 1998), particularly due to its measurement of abilities such as reading comprehension, verbal comprehension, and quantitative reasoning (Carroll, 1993). Evidence is mixed, however, regarding whether cognitive ability is a predictor of self-development activities. Maurer, Weiss, and Barbette (2003) found a significant positive relationship between perceived intelligence and attitudes towards self-development and intentions to self-develop, but Hezlett, Koonce, and Kuncel (1996) found no relationship between cognitive ability and overall development activities, or ratings of skill improvement. Similarly, Maurer, Lippstreu, and Judge (2008) did not find a relationship between cognitive ability and either interest in self-directed learning or actual learning. It would seem that more static abilities such as cognitive ability may have a role in self-directed learning, but focusing on training the large number of skills that have been identified as important for success currently appears to be of the greatest value. When it comes to self-learning strategies, a larger repertoire

may give greater benefit than just a few well-honed strategies. Self-learning concerns a vast array of knowledge domains and skills—having a similarly vast storehouse of learning strategies may better enable a learner to adapt to what different situations require.

It is important to note that self-regulation of learning is not only affected by the set of skills presented above, but also by several motivational influences. There are a host of individual traits, beliefs, and attitudes that affect the motivation of self-directed learners to acquire these self-regulatory skills and to engage in self-directed learning. We will turn to a discussion of these influences next.

Motivation to Engage in Self-Directed Learning

Although a learner's ability to master the key self-regulatory skills required for self-directed learning is crucial for learning success, it is also important that learners be motivated to engage in self-directed learning. Not surprisingly, motivation to learn is an important predictor of self-development activity (Birdi et al., 1997; Boyce et al., 2010; Maurer & Tarulli, 1994; Major, Turner, & Fletcher, 2006; Noe & Wilk, 1993). Within a self-directed learning paradigm, motivation to learn can be operationalized as the direction, intensity, and persistence of learning-directed behavior (Colquitt, LePine, & Noe, 2000). Learners identify what they want to learn (direction), the extent to which they want to learn about it (intensity), and they are willing to work at the self-learning process until they achieve what they set out to learn (persistence).

Research has demonstrated that a number of factors affect a learner's motivation to self-develop, including openness to experience, conscientiousness, a proactive personality, self-efficacy for learning, and learning orientation (e.g., Boyce et al., 2010; Major, Turner, & Fletcher, 2006; Maurer & Tarulli, 1994; Maurer, Weiss, & Barbeite, 2003). A variety of other traits have been linked to the motivation to engage in self-directed learning on rational grounds, but have to date garnered either little empirical support or mixed support. These include constructs such as energy, curiosity, creativity, perseverance, initiative, autonomy, need for achievement, a love of learning, and an internal locus of control (e.g., Crick & Yu; Guglielmino, 1977; McCall, Lombardo, & Morrison, 1988; Merriam & Caffarella, 1999; Purdie et al., 1996; Sessa & London, 2006).

In the sections that follow, we explore the influence of beliefs and traits on motivation to self-learn by taking an expectancy framework approach (Vroom, 1964). This framework is useful because there are a number of beliefs that combine to motivate an individual to want to engage in self-directed learning (Maurer & Tarulli, 1994). Specifically, the learner must believe that:

1. He or she has a knowledge gap,
2. Remedying the knowledge gap is important,
3. The knowledge gap can be remedied through self-directed learning, and
4. He/she is capable of succeeding in self-directed learning.

The first belief, understanding that he or she has a knowledge gap, was discussed in the previous section with respect to diagnosing learning needs. Each of the other three perceptions, however, is captured within the three key elements of the expectancy theory framework of motivation. As Boyce et al. (2010) suggest, in order for an individual to be motivated to self-learn, he or she must (1) value the learning outcome (valence), (2) believe that self-directed learning will lead to that valued outcome (instrumentality), and (3) believe that he/she can successfully self-learn (expectancy). We will therefore use this framework to organize the discussion of these characteristics, examining beliefs relevant to each of these elements, followed by a brief consideration of traits that affect motivation to self-learn.

Valuing the Learning Outcome

If an NCO determines that a knowledge gap exists, he or she will only be motivated to self-learn in that area if he or she believes that remedying the knowledge gap is important. Expectancy theory refers to this as valence, the affective value of the outcome in a given domain. If a Soldier values success or performance in a given domain, he or she should be more motivated than others to develop in that area. Along these lines, Maurer and Tarulli (1994) found that employees varied in the extent to which they valued different learning outcomes, and Boyce et al. (2010), found that Army officers with higher job involvement, organizational commitment, and career motivation held higher motivation to self-learn concerning domains related to leadership.

Three constructs—job involvement, organizational commitment, and career motivation—were combined in Boyce et al.'s research to reflect an individual's work orientation, a concept they defined as the centrality and importance of work and the work context to the individual. Job involvement measures the degree to which an individual identifies psychologically with his or her job (Lodahl & Kejner, 1965). For example, one item states: "The major satisfaction in my life comes from my job." Organizational commitment captures the extent to which a learner identifies with an organization, including an acceptance and belief in the organization's values and goals. Individuals who value their organization and are committed to it would be expected to have greater motivation to improve their performance within it. The third construct is career motivation. Learners who are very involved in their career and who are interested in career progression are especially interested in learning knowledge and skills that will help them succeed in their career. Career motivation is therefore a very important factor in motivating self-directed learning as well (Boyce, et. al., 2010; Maurer & Tarulli, 1994).

While these three constructs do not directly measure the valence of a particular learning outcome, they reflect the value of succeeding at work to individuals, and therefore contribute to predicting the individual's motivation to engage in self-learning that is relevant to their work. In addition to these scales that reflect the general value to an individual of succeeding at work, scales could be developed to measure the value of succeeding or gaining knowledge and skills in specific domains.

We will next consider the importance of an individual's belief that self-directed learning can help him or her to be successful in learning a particular domain.

Is Self-Directed Learning Effective?

In addition to the importance of valuing the learning outcome, prospective learners need to believe that engaging in self-directed learning will lead to an increase in their success in the valued domain. Within the expectancy framework, instrumentality refers to whether pursuing self-directed learning will lead to other valued outcomes (Facteau, Dobbins, Russell, Ladd, & Kudisch, 1992; Maurer & Tarulli, 1994). Pre-training motivation has been demonstrated to be high when a learner believes he or she will benefit in some way from learning (Mathieu & Martineau, 1997). It is not surprising that beliefs about the benefits of self-directed learning have been related to motivation and involvement in self-directed learning activities (Birdie et al., 1997; Maurer & Tarulli, 1994; Noe & Wilk, 1983). This suggests that it is important to encourage Soldiers and NCOs to view self-directed learning as an effective tool to gain knowledge and skills and to improve their proficiency in identified areas.

Can I Succeed at Self-Directed Learning?

The third belief that drives motivation to engage in self-directed learning is the learner's belief that he or she will be successful at self-learning. Self-efficacy is a key element in this equation. Self-efficacy refers to personal beliefs about having the means to learn or perform effectively (Bandura, 1997). Past research has demonstrated that self-efficacy is a key predictor of whether a person will choose to perform a behavior, as well as his or her persistence, thoughts, and feelings while performing the behavior (Bandura, 1997; Gist & Mitchell, 1992). People with high self-efficacy are resilient and adaptable in the face of barriers, believe they can perform well across a variety of situations, tend to be positive or optimistic, and believe they can bring about positive outcomes (Sensa & London, 2006). They have also been found to be more comfortable working on challenging assignments and assuming responsibility for personal development (Bandura, 1982; Bandura & Schunk, 1981; Gist & Mitchell, 1992; Stevens & Gist, 1997).

Self-efficacy is effective because it increases a learner's belief that he or she will be successful at a task—in this case, learning, and therefore fosters persistence in learning (Boyce et al., 2010; Maurer & Tarulli, 1994; Noe & Wilk, 1993). Research examining self-efficacy with respect to training and development specifically has shown that self-efficacy *towards development* predicts attitudes towards employee development programs (Maurer, Mitchell, & Barbette, 2002; Maurer & Tarulli, 1994), learning motivation during training (Colquitt, LePine, & Noe, 2000), attitudes toward 360-degree feedback (Maurer et al., 2002), participation in developmental activities outside of work (Maurer et al., 2002; Maurer & Tarulli, 1994), and motivation to continuously learn (Colquitt et al., 2000). Theoretically, a sense of high self-efficacy towards learning will be crucial for those interested in self-directed learning. Several studies have confirmed that self-efficacy for learning is an important predictor of both interest and participation in self-directed learning activities specifically (Boyce et al., 2010; Maurer & Tarulli, 1994; Maurer, Weiss, & Barbeite, 2003; Noe & Wilk, 1991). Self-efficacy for learning may also be related to the likelihood of using self-regulatory skills, because learners high on self-efficacy set more challenging goals, and are better at self-monitoring and self-evaluating (Bouffard-Bouchard, Parent, & Larivee, 1991; Zimmerman, Bandura, & Martinez-Pons, 1992).

Another factor that affects whether an individual believes that he or she can succeed at self-learning is how he or she is oriented toward his or her learning goals. Dweck and Leggett (1988) found that there are two primary goal orientations—performance goal orientation and mastery orientation. Those with a performance goal orientation tend to believe that ability is fixed, while those with a mastery orientation believe it is malleable (Dweck & Leggett, 1988). In part due to these beliefs, those with a mastery goal orientation have a desire to increase their own competence by learning new things, while those with a performance goal orientation prefer to demonstrate their competence to others. Consistent with these desires, Bell and Kozlowski (2002) found that performance-oriented individuals avoid tasks that are difficult or challenging. In contrast, those with a mastery goal orientation demonstrate an adaptive response pattern, persisting in the face of failure, pursuing more complex learning strategies, and pursuing difficult tasks (Bell & Kozlowski, 2002). Also consistent with these attributes, Boyce et al. (2010) found that mastery orientation was a strong predictor of motivation for self-directed learning activities.

A mastery orientation fosters both an interest in learning new skills and confidence about successfully learning those skills. It leads learners to exhibit an adaptive, rather than a defensive, set of response patterns. Like those high in self-efficacy for learning, those high in mastery orientation persist in the face of failure, pursue more complex learning strategies, and pursue difficult and challenging tasks (Bell & Kozlowski, 2002). For all these reasons, mastery orientation is an important predictor of both interest and participation in self-directed learning activities (Birdi et al., 1997; Boyce et al., 2010; Maurer et al., 2008).

Related to the concept of mastery orientation are implicit personality theory or individual self-theories. Dweck and Leggett (1988) proposed that individuals hold core beliefs known as implicit self-theories; from this perspective, individuals can be categorized as either malleable (i.e., an incremental theorist) or fixed (i.e., an entity theorist). According to Dweck (1999), an incremental self-theory centers on the belief that intelligence, personality, or other core competencies are malleable. That is, with effort and/or proper guidance, people can change core attributes. In contrast, an entity self-theory centers on the belief that individuals cannot change their personality, cognitive ability, or core competencies. This theory has demonstrated robust effects on relevant outcomes such as training performance (Martochhio, 1994) and managers' coaching abilities (Heslin, VandeWalle, & Latham, 2006). For example, Heslin, Latham, and VandeWalle (2005) reported that managers adopting more of an incremental perspective were more likely to invest resources in helping others to develop and improve their performance. Other research (principally with school-age children) by Dweck and colleagues (e.g., Henderson & Dweck, 1990; Hong & Dweck, 1992) revealed that in response to academic failure, those holding an incremental perspective are more likely to respond positively and generate strategies for improvement, while those holding an entity perspective are more likely to respond negatively to failure, as they viewed failure as indicating a lack of ability. In sum, implicit self-theories appear to hold implications for both responses to feedback, challenging assignments, etc., as well as the motivation of organizational members tasked with supporting developmental activities.

As a final note regarding beliefs, a number of studies have demonstrated that the reason traits such as self-efficacy, learning orientation, and perceived benefits of self-development affect motivation to self-develop is that they positively affect attitudes towards self-development. Positive attitudes towards self-development subsequently predict intentions to self-develop,

13

which affect actual participation in self-directed learning activities (Maurer et al., 2003; Maurer et. al., 2008). Research has demonstrated that positive attitudes towards development are positively related to intentions to participate in self-directed learning, which are positively related to actual participation (Maurer et al., 2003).

Relevant Traits

In addition to the numerous belief constructs that affect an individual's motivation to engage in self-directed learning, there are trait characteristics that are likely to affect this process as well. Two of the traits that have been investigated are openness to experience and conscientiousness.

Openness to Experience

Individuals who are high on openness to experience are considered to be curious, broad-minded, and intelligent (Costa & McCrae, 1992). Almost by definition, individuals who are open to new experiences are likely to be interested in self-development activities. Perhaps not surprisingly, therefore, openness to learning is predictive of motivation to engage in self-development (Boyce et al., 2010; Maurer, Lippstreu, & Judge, 2008). Openness to experience may also be an important predictor of the likelihood of using self-regulated learning strategies. McCall et al. (1988) found that employees who are open to learning tend to reflect on their experiences. They ask themselves why things happen and why they respond as they do. They also seek and react to feedback, understand their strengths and weaknesses, learn quickly from their experiences, ask others what they think, and ask clarifying questions (McCall et al., 1988).

Conscientiousness

Conscientiousness is comprised of two related facets: achievement and dependability. Conscientious individuals tend to be thorough, organized, goal oriented, disciplined, and diligent (Costa & McCrae, 1992). Due to these traits, conscientious individuals may be likely to exhibit a mastery learning orientation, take charge of their own learning, set difficult but realistic learning goals, and persist in the face of obstacles. In one recent study, Maurer et al. (2008) found empirical support for these theoretical considerations. In a path model including several individual and situational characteristics relevant to self-development activity, these researchers found that conscientiousness indirectly affected motivation to engage in self-development activities through its affect on learning orientation and self-efficacy. Major, Turner, and Fletcher (2006) also found that conscientiousness and a construct they termed "proactive personality" predicted motivation to self-develop. Major et al. (2006) defined a proactive personality as a stable tendency to take action to affect desired environmental change.

Although the stable traits may be difficult to develop or change, understanding their impact on readiness to engage in self-directed learning can be valuable to developing compensatory strategies as one prepares for self-directed learning. While the traits are difficult to change, the beliefs and self-regulatory skills can be developed, and research suggests that organizations can have an important impact on individuals' success at self-directed learning

throughout the process. In the following section we will examine the organization's role in various elements of the self-directed learning process.

The Role of Organizations

While self-directed learning is, by definition, a process that is driven by each individual within an organization, this does not suggest an organization has no role in the process. In fact, there are a considerable number of ways in which organizations can facilitate self-directed learning in their employees. Two primary organizational functions emerge in the literature – creating and maintaining a learning climate, and providing tools and resources. In examining these issues, we will include concrete steps the Army could take to support self-directed learning.

Creating and Maintaining a Learning Climate

Organizations can increase learners' motivation to engage in self-learning activities by creating a context that is conducive to continuous learning. Gephart, Marsick, Van Buren, and Spiro (1996) used the term "learning organization" to describe an organization that has an enhanced capacity to learn, grow, and transform itself. Learning organizations are characterized by the following key features: 1) jobs are designed such that individuals are encouraged to be flexible and to experiment while performing tasks, 2) learning is rewarded by management, 3) learners naturally share and generate knowledge through doing their job, and 4) systems exist for capturing and distributing knowledge. As an example of the fourth feature, organizations may publish directories that list the areas of expertise of all employees. Organizations also facilitate the sharing of information by encouraging employees to present what they have learned in their self-directed learning efforts to other members of the organization. In the Army this could easily be accomplished through NCO professional development (NCOPD) sessions.

A positive learning climate in the unit can also encourage organizational commitment and support job involvement and career orientation, factors that also have a significant impact on an individual's motivation to engage in self-directed learning. Motivation to engage in self-directed learning may also be related to perceptions of organizational rules, policies and guidelines, and an organization's general orientation towards employee self-development (Kozlowski & Farr, 1988; Kozlowski & Hults, 1987). Organizations can positively affect job-related outcome beliefs by ensuring that participation in self-directed learning activities is rewarded. One way to do this is to make continuous learning a performance dimension and include it within the performance appraisal system (London & Mone, 1999). For instance, employees could be assessed, and rewarded, on such factors as: (1) anticipating learning requirements, (2) setting developmental goals, (3) participating in learning activities, (4) asking for feedback to test goal relevance, (5) tracking progress, (6) assessing results of learning acquisition tests, and (7) taking advantage of opportunities to apply what has been learned. That may be too detailed to include in the NCO Evaluation Reports (NCOERs), but magnifying the concept from within the Training dimension of the NCOER could be useful. Another way to emphasize this aspect of performance is through emphasis in promotion criteria.

The learner's perception of supervisory, peer and coworker support may also affect motivation to engage in self-directed learning (Kozlowski & Farr, 1998; Kozlowski & Hults, 1987; Maurer & Tarulli, 1994; Noe & Wilk, 1991). Support for development may involve such things as encouragement, persuasion about the value of development, and providing time, information, assistance, resources, and rewards for participation (Maurer et al., 2003). In general, supportive supervisors demonstrate concern for employees' feelings and needs, encourage them to voice their own concerns about learning, provide mainly informational feedback, and facilitate skill development (Oldham & Cummings, 1996).

Providing Feedback

Another way in which organizations can support self-directed learning is to facilitate the employee receiving appropriate feedback about learning. This can have a number of positive effects. First, feedback enhances learning, keeps goal-directed behavior on target, increases motivation to set higher goals, increases employees' ability to detect errors on their own, and increases the amount of control employees feel (London & Mone, 1999; Ilgen, Fisher, & Taylor, 1979). Research has suggested, however, that the type of feedback provided to employees has an important impact on their motivation to engage in self-directed learning. To be motivational, feedback should be focused on behaviors, not the person, be constructive when possible, and be objective (Kluger & DeNisi, 1996). Additionally, feedback should be provided as close as possible (temporally) to the actual behavior, it should focus on behavior that is under the control of the learner, and it should be communicated frequently (Cascio & Aguinis, 2010). Individuals can also be trained to more accurately observe and judge behavior before providing feedback (Woehr & Huffcutt, 1994), and organizations can use instruments such as the Feedback Environment Scale (Steelman, Levy, & Snell, 2004) to determine employees' perceptions of the utility of feedback. Scales such as these investigate perceptions of the credibility of the source of feedback, its quality, the delivery, how positive and negative feedback is handled, the availability of feedback, and whether mentors or others promote feedback-seeking.

One area in which organizations can provide feedback is learning goals. Numerous studies have demonstrated the importance of setting learning goals (e.g., see Locke & Latham, 1990). The consistent finding is that learners who set specific, difficult, and achievable goals exhibit superior effort, investment, and performance compared to learners who simply make a commitment to do their best (Locke & Latham, 1990). Organizations can assist in this goal setting process by sharing expected milestones, and helping learners to set specific learning goals that are organizationally relevant.

Building Confidence/Self-Efficacy

As presented previously, research is clear regarding the importance of self-efficacy, mastery orientation, and the individual's belief that he or she can successfully engage in self-directed learning. Fortunately, considerable evidence suggests that self-efficacy perceptions can be enhanced. Some of the key processes for enhancing self-efficacy include enactive mastery experiences, modeling, and persuasion (Gist & Mitchell, 1992). Mastery experiences help learners realize they are capable of understanding new things by facilitating successful learning in a set of progressively more difficult steps. Organizations can help foster mastery experiences

by giving learners a set of learning tasks in a domain that proceeds in stages, and by providing rewards upon successful completion of each stage. As an example, a *Tae Kwon Do* academy provides such mastery experiences for its students by breaking down physical movements into component parts (e.g., stances, kicks, blocks, and strikes), training each individual part to mastery, and rewarding learners for successful mastery of basic moves by awarding different color belts as they progress. The concept would be to spend time within the unit or schoolhouse to build Soldiers' and NCOs' confidence for self-directed learning.

Self-efficacy for learning can also be increased when organizational mentors effectively model self-management strategies. For instance, mentors can model how to assess learning problems, how to set specific, reasonably difficult goals for learning, how to monitor ways in which the environment helps or hurts goal attainment, and how to reward themselves for working towards a learning goal (Locke & Latham, 1990). According to Bandura (1986), such modeling is one of the primary means by which we learn. By watching others perform a skill, and then modeling that behavior oneself, learners can boost their self-efficacy in a domain notwithstanding that they may have undergone many experiences confirming their inefficacy in that domain. Finally, persuasion can sometimes be an effective method of enhancing self-efficacy. It may be useful for organizational leaders and mentors to explicitly explain to prospective learners that they are capable of learning what they need to learn, preferably by providing past examples of learning success (Bandura, 1997; White & Locke, 2000). Leaders can also enhance self-efficacy by providing subordinates with strategies for how to reach important goals. Transformational leadership behavior, in particular, may be important in raising subordinate self-efficacy. Transformational leaders boost followers' efficacy for learning by providing intellectual stimulation and by providing an inspiring vision (Bass, 1985).

Providing Tools and Resources

There are a number of areas in which an organization can provide tools and resources to support individual self-directed learning. These include supporting the identification of competency areas for self-learning, assisting with a knowledge and skills gap analysis, providing access to self-learning assessment and evaluation tools, and assisting with identifying learning resources.

Identifying Competencies to Develop

Within an organization, employees may be motivated to develop their knowledge and skills, but may not always have accurate insight into what types of knowledge and skills the organization perceives to be the most useful. In the Army, Soldiers and NCOs must identify the key current and future competencies needed to reach their career goals in their specialty area, and develop their leadership abilities. ALC 2015 provides this information, offering a comprehensive overview of the key competencies required for success as an NCO that includes:

- Character and accountability
- Comprehensive fitness
- Adaptability and initiative
- Lifelong learner (includes digital literacy)

- Teamwork and collaboration
- Communication and engagement (oral, written, negotiation)
- Critical thinking and problem solving
- Cultural and joint, interagency, intergovernmental, and multinational competence
- Tactical and technical competence (full spectrum capable)

The Institute for NCO Professional Development (INCOPD) summarizes these using the graphic shown in Figure 1. This is highly beneficial in supporting self-directed learning by clearly stating the desired competencies. Other information that is helpful includes clearly stating what will be rewarded, and the level of performance that is expected (Sessa & London, 2006). When provided with this information for their current and expected future positions, employees have a clear guide for determining what knowledge and skills are valued by their organization, and which ones they should work to self-develop. At a more micro level, Soldiers entering new jobs benefit greatly by having a continuity book or experienced individual available to detail the requirements of their new job. In the absence of this, Soldiers and NCOs often are left to identify what needs to be done, and the knowledge and skills they need to acquire in order to accomplish it.

Figure 1. INCOPD NCO Competency Model

After identifying the competencies required for success in a domain, learners need to determine their current level of knowledge in a given self-development domain. In this step, the Soldier in effect diagnoses his or her learning needs by assessing the gaps between his or her

current and desired knowledge and skills (Knowles, 1975; Patterson, Crooks, & Lunyk-Child, 2002). This determination is crucial as it provides a basis for subsequent learning decisions. For instance, a leader seeking to develop his or her negotiating skills needs to determine if he or she needs an entry-level or more advanced negotiations course. To assist in this process, learners may need to obtain feedback about their current standing on the identified competency dimensions. Organizations can help employees understand their learning gaps by using a multisource feedback process, such as a 360-degree feedback process (Kraiger & Wolfson, 2011). This type of feedback process is not only useful in highlighting knowledge gaps at the initial planning stage, it can also be applied following self-learning to evaluate whether learning has taken place.

Self-Learning Assessment Tools

In addition to assessing one's capabilities with respect to the competencies required for success in a domain, it is useful for the individual to assess his or her motivation to self-learn. While much of the initial work in assessing motivational and other learning-related deficits must be done by learners themselves, organizations have an important role to play in surfacing these learning issues. For instance, some organizations have asked prospective learners to complete one of the many available self-learning readiness inventories, such as the Self-Directed Learning Readiness Scale (Gugliemino, 1977), the Learning Profiles Questionnaire (Confessore & Kops, 1998) or the Effective Lifelong Learning Inventory (Crick, Broadfoot, & Claxton, 2004). In addition to helping learners diagnose learning or motivational deficits, these inventories examine a number of other issues related to an employee's readiness for self-directed learning, including his or her ability to self-manage, propensity for seeking feedback, curiosity for learning, and preference for challenge. Based on the results, organizations can use developmental programs to target specific learning deficits, and can assist learners who score low on self-directed learning or who perceive themselves to not be skilled at self-directed learning.

Organizations can also provide employees with access to learning style inventories. While the benefit of taking learning styles into consideration in the classroom is questionable (e.g., see Pashler, McDaniel, Rohrer, & Bjork, 2008), taking one's learning preferences into consideration when making choices between alternative approaches available within self-directed learning could provide benefit from a motivational standpoint. For instance, learners vary in their ability to grasp information—some learners prefer to focus on concrete experiences, while others prefer abstract conceptualization (Sessa & London, 2006).

One aspect of learning style that might be helpful to consider is whether one prefers low or high structure learning environments. Research has demonstrated that higher-ability learners learn more when placed in a less structured learning environment, and lower ability learners excel when there is more structure (Snow, 1989; Snow & Lohman, 1984). In settings with high structure, instructors maintain a high level of control over learning activities. Typically, instructional tasks are broken down into small units and frequent clarification of material is made. Further, instructors typically focus student attention on the material to be learned, maintain pacing, and provide feedback and reinforcement (Snow, 1989). In contrast, methods that are *low* in structure present material at a relatively rapid pace, under incomplete learning conditions where the students must infer much of the instructional message for themselves

(Snow, 1989; Snow & Lohman, 1984). Organizations can provide both access to measurement tools regarding learning preferences, and assistance with interpreting and applying the results in the design of self-directed learning.

Identifying Resources

Upon determining what to learn, assessing knowledge gaps, assessing readiness to learn, and repairing any motivational or learning deficits, prospective learners need to identify self-directed learning resources, and choose appropriate learning experiences (Knowles, 1975; Locke & Latham, 1990). Choosing appropriate learning experiences involves choosing where to learn, when to begin the learning cycle, and which instructional methods to use (Adams, 2007). To help learners determine where to learn, organizations can compile a set of "learning events" that train the knowledge and skills required by the organization's competency model. Such learning events may be formal or informal courses either inside or outside of the organization. For example, Kraiger and Wolfson (2011) proposed that organizations create a matrix of competencies by (formal or informal) learning opportunities (or events), and systematically record evaluation data regarding the extent to which specific opportunities were effective for specific competencies.

Choosing the appropriate learning events also involves deciding which learning events are likely to possess the instructional design features that will lead to the most learning. In a recent review, Orvis and Ratwani (2010) considered the instructional design features that are most likely to lead to learning in junior military leaders. They determined that the best courses for learning leadership skills have high content relevancy in addressing leaders' most pressing needs, are engaging to learners, require leaders to practice what they are learning, provide progress evaluation information, are challenging, and provide experiential variety (Orvis & Ratwani, 2010). Although prospective learners will seldom have all of the information available prior to course selection to make these assessments, learners should attempt to acquire this information when possible. Organizations can help facilitate this evaluation process by asking employees to complete rating forms of their experiences in different courses. These ratings forms could be tailored to assess the instructional design features determined by Orvis and Ratwani (2010) to best facilitate learning. With the passage of time, the best courses for developing various competencies can be identified through this evaluation process. These ratings could eventually be used by mentors to help learners choose the best quality learning experiences.

Summary of Findings

Our goal in this review has been to describe the key skills and motivational factors related to successful self-directed learning, as well as identify actions organizations can take to facilitate self-directed learning among their employees. To become successful self-directed learners, Soldiers and NCOs must take personal responsibility for learning a very wide range of self-regulatory skills that should be used prior to, during, and following the self-directed learning experience. They must also learn to be self-aware of their learning as they proceed through the self-development process, and critically evaluate their learning at all stages. As the research

indicates, self-regulatory skills can be learned, and have an important impact on learning skills. Although individual learners must be mainly responsible for acquiring and executing these self-regulatory processes, organizations can assist in this process by (1) providing insight into the competencies that should be developed, (2) assisting with motivational assessment and identifying resources, and (3) providing feedback throughout the learning process about initial knowledge gaps, the effectiveness of strategy selection throughout learning, and whether learning has had the intended effect on improving the targeted organizational competencies.

Regarding motivation to engage in self-directed learning, an important theme of this review has been that individuals and organizations both have important roles to play in helping employees acquire and maintain the motivation to be continuous learners. Research suggests that the motivation to become a continuous learner stems from a wide set of individual traits, beliefs and attitudes, such as self-efficacy, learning orientation, conscientiousness, openness to experience, career motivation, job involvement, perceived benefits of self-development, and a wide set of organizational characteristics, such as organization-wide support for self-development, the provision of accurate and timely feedback about self-development efforts, and rewards for self-directed learning activity. Interestingly, these antecedents of motivation to self-develop appear to vary considerably with respect to the degree to which they can be modified through individual or organizational action. At one extreme, individual traits such as conscientiousness, openness to experience, or a proactive personality may be very difficult to change through an individual or organizational intervention. At the other extreme, individual beliefs and attitudes about learning, and organizational characteristics that support learning, can all be modified to a large degree through either individual or organizational action. In the middle of this continuum, characteristics such as self-efficacy and learning orientation, though difficult to change, can still be influenced by individual and organizational action.

Future Directions

A Model of Lifelong Learning

To advance toward the goal of providing Soldiers with a roadmap for developing the competencies, or knowledge, skills, abilities, and other characteristics (KSAOs), required for successful self-learning, the methodological steps proposed by Kraiger and Wolfson (2011) can be used to create a lifelong learning model.

Kraiger and Wolfson (2011) propose a model that structures learner-generated participation in a set of "learning events" relevant to the development of both job-relevant knowledge and skill and lifelong learning skills that may be important for continued success within a job. A matrix of KSAOs and learning events can be developed that describes: (1) the knowledge and skills relevant to successful performance as an NCO, (2) the lifelong learning skills required, and (3) the range of lifelong learning events that allow the NCO to develop one or more of the identified skills.

This type of organizational matrix enables Soldiers to create an individualized lifelong learning plan based on the assessment of their current standing on the identified competency

areas. This could be accomplished with a 360-degree feedback tool, or even just with self-ratings or a subset of the 360 degree raters if needed. When paired with information about an individual's level of motivation for learning, self-identified learning needs, and awareness of opportunities and/or career management skills, this assessment could be used by the NCO and a mentor to decide which of several learning events in the matrix should be pursued to develop certain learning goals. The goal would be to have a web-based tool that is integrated with the 360-degree feedback results and therefore would be easy to navigate and use. Finally, this structure can also provide the groundwork for future periodic evaluation of each NCO's development of critical knowledge and skills.

It also needs to be taken into account that a great deal of learning on the job for Soldiers and NCOs comes through experiences that cannot be planned. To provide training in the appropriate self-learning strategies for their unique professional context will enable Soldiers and NCOs to better adapt to unexpected changes in job demands and mission requirements. Having a force in possession of widely applicable self-learning strategies may help the Army ensure that it will be able to adapt effectively when circumstances change.

Assessing and Training for Self-Directed Learning

Given the importance of self-directed learning to the ALC 2015, it is critical that the Army develop tools to build Soldiers' self-learning skills and support a self-learning system. These tools could include e-learning modules to develop self-learning knowledge and skills, online assessment and evaluation tools, and self-learning concepts and exercises integrated into courses in the military education system. While a number of assessment tools exist to evaluate self-learning readiness, related traits, and organizational support, no measure exists to assess an individual's current preferences for particular self-learning strategies and the decision process he or she goes through in determining what approach to learning to take.

As part of this research effort, we developed such a measure that was specifically tailored to the work environment and learning context of Army NCOs. The measure was designed to capture information regarding NCO's current self-learning strategies and to provide feedback and suggestions for areas to build on or improve knowledge and skills for self-learning. Since our focus in this report was on reviewing the relevant literature on self-directed learning, the research we conducted to develop the NCO Self-Learning Strategies Scale and our findings based on data collected using the Scale will be presented in a subsequent report. In addition, we have developed a set of draft training modules that can be used by leaders to evaluate their self-learning strategies and build their knowledge and skills for self-learning. These will be published in a subsequent research note. In order to guide the process of developing self-learning skills among Soldiers and NCOs, it would be useful to create a roadmap for the development and support of self-directed learning that describes the tools that will be developed, their integration into the Army, and the role of personnel at different levels of the organization in supporting self-learning.

To develop the self-learning skills of Soldiers and NCOs supports TRADOC's strategic goal of providing the Joint Force Commander with Soldiers who have the capabilities required to dominate the full spectrum of operations (FM 350-1, U.S. Army, 2009). Changing operational

circumstances make necessary that Soldiers and NCOs acquire new knowledge and skills to adapt quickly not only in action, but in understanding. Future operations are expected to be marked by persistent conflict in which state and nonstate actors use diverse tools to pursue their objectives, including tools that are not only military, but also diplomatic, informational, and economic. Operational contexts will extend beyond geographic locations to cyberspace as well (FM 7-0, U.S. Army, 2008). This requires Soldiers, NCOs, and Officers to have an ability to learn quickly the knowledge and skills they will need to function effectively across many domains, including those traditional to the military as well as those that may be unfamiliar. It also requires that Soldiers and NCOs bring new knowledge and skills into the Army that extend beyond their formal military training.

As the Army adapts its organization to create a more agile structure to meet emerging requirements, the Army learning system likewise will transform to ensure it is building the capacity to enable our Soldiers to learn and adapt more quickly than our adversaries (TRADOC PAM 525-8-2, U.S. Army, 2010). Emerging technologies provide access to a wealth of knowledge and opportunities to learn new skills. The Army needs to support Soldiers, NCOs, and Officers in accessing and utilizing these technologies—such as mobile computing, open content electronic books, simple augmented reality, gesture-based computing, and visual data analysis—as well as more traditional media for information—such as books, professional journals, Technical Manuals, Field Manuals, and social networks—to develop continuously in their professional knowledge and skills.

Recommendations

The Army can create and maintain a learning climate that is conducive to self-directed learning by providing encouragement, time, information, resources, rewards, and models of self-learning to Soldiers and NCOs. Possible ways to do this are to include self-learning objectives in NCOERs (e.g., setting development goals) or to include successful self-learning outcomes in promotion criteria. The Army can also continue to focus on developing systems that allow Soldiers, NCOs, and Officers to generate and share knowledge using resources like the Center for Army Lessons Learned (CALL), for example. Finally, leaders can provide direct support for this type of self-development, building Soldiers and NCOs confidence and competence in self-learning skills as well as providing feedback on the outcomes of self-learning projects (e.g., monitoring self-learning goals of subordinates).

With respect to tools and resources, the Army can identify required competencies, similar to those described in ALC 2015, and tailor these to each rank or to level of experience in the Army. Continuity books are useful resources for identifying job requirements and extracting competencies. A variety of assessment tools are available that are designed to measure various aspects of self-learning skills and attitudes in general. These could be adapted to the Army context, or the Army can develop related tools in-house to address its particular needs and unique work environment. Finally, a roadmap can be compiled that describes learning events associated with ALC 2015 competencies that could provide a means for self-learners to organize the overarching goals for their learning and development over time, applying the specific techniques of self-learning alongside the broader set of knowledge and skills that support self-development.

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Acronyms

ALC 2015 (ALC)	Army Learning Concept 2015
CALL	Center for Army Lessons Learned
INCOPD	Institute for Noncommissioned Officer Professional Development
IMT	Initial Military Training
KSAOs	Knowledge, skills, abilities, and other characteristics
NCO	Noncommissioned Officer
NCOER	Noncommissioned Officer Evaluation Report
NCOPD	Noncommissioned Officer Professional Development
PME	Professional Military Education
TRADOC	U.S. Army Training and Doctrine Command