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Development and Validation of the U.S. Army Learning Organization Assessment and Report

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14. ABSTRACT The objective of this research was to further advance the U.S. Army Learning Organization (LO) capability by expanding on previous research that developed a U.S. Army LO Maturity Model (ALOMM). Using ALOMM, the current research sought to develop and validate a U.S. Army LO Assessment (ALOA) and to summarize the organizational-level ALOA results in a meaningful way (i.e., development of the U.S. Army LO Maturity Report [LOMR]). Research began with the development of the ALOA using the findings from the literature review and from the ALOMM validation. The 72-item ALOA was then administered to Active Duty Soldiers from 12 U.S. Army Companies within an intact operational Brigade. The administration of the ALOA with these Companies included a feedback survey and administration of a parallel measure to establish evidence of convergent validity. Finally, leaders of the 12 Companies were provided with a LOMR for their organization and asked to provide feedback on the value and utility of the LOMR. Factor analyses resulted in a reduction of ALOA items from 72 to 69. Research findings support initial evidence of validity for the 69-item ALOA and suggest the ALOA is capable of indexing U.S. Army LO maturity as defined by the ALOMM. Feedback received from leaders of participating Companies indicate they value the end-to-end ALOMM, ALOA, and LOMR, but desire additional guidance for implementing changes to advance LO maturity in their organizations. Specifically, this guidance should be developed to help organizational leaders derive precise actionable steps for maturing as LOs.					
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DEVELOPMENT AND VALIDATION OF THE U.S. ARMY LEARNING ORGANIZATION MATURITY MODEL AND ASSESSMENT

EXECUTIVE SUMMARY

Research Requirement:

The U.S. Army Institute for the Behavioral and Social Sciences (ARI) completed research to develop a definition for “learning organization” (LO) appropriate for use by Army organizations. This definition was used to develop and validate a functional maturity model (ALOMM) to describe what U.S. Army LOs look like and what they do. U.S. Army stakeholder partners valued the model but expressed a need to assess organizations along the continuum of learning maturity expressed by the model. Thus, the first objective of this phase of research was to expand the U.S. Army LO Capability by developing and validating a U.S. Army LO Assessment (ALOA). Importantly, in order for U.S. Army leaders to identify changes that could advance the learning maturity of their organization, the results of the organizational-level ALOA must be accessible to leaders in a digestible format vice copious raw data output. Therefore, the second objective of this research was to develop and evaluate a Learning Organization Maturity Report (LOMR) that is easy for leaders to generate and summarizes the ALOA results in useful and meaningful way.

Procedure:

The research began with the development of the ALOA from the findings of the literature review and research activities that were used to develop and validate the ALOMM. The ALOA was then administered to 12 Active Duty U.S. Army Companies within an intact operational Brigade. The administration of the ALOA with these companies included a feedback survey and administration of a parallel measure to establish evidence of convergent validity. Finally, leaders of the companies were provided with a LOMR specific to their Company and asked to provide feedback on the value and utility of the LOMR.

Findings:

The key research findings and conclusions are that, after minor refinements to reduce the 72-item assessment, statistical evidence suggests the 69-item ALOA is valid and capable of indexing U.S. Army LO maturity as defined by the ALOMM. Furthermore, leaders of U.S. Army organizations value the end-to-end ALOMM, ALOA, LOMR process, but desire more specific actionable guidance.

Utilization and Dissemination of Findings:

The findings of this research indicate U.S. Army Companies can begin using the refined, 69-item version of the ALOA to index the LO maturity of their organizations as defined by the ALOMM. Additionally, the LOMR is a valuable and useful summary of ALOA results. LOMRs can be furnished to leaders of U.S. Army organizations that take the ALOA to provide insights

into the learning maturity of their organization. Finally, organizational leaders would benefit from additional guidance on interpreting their LOMRs. In particular, this guidance should be developed to help organizational leaders derive specific actionable steps for maturing as LOs. This guidance should include concrete examples of LO strengths and opportunities for maturity and should also assist organizational leaders in identifying the root causes of lower levels of LO maturity including barriers that could be removed to enable LO maturation.

DEVELOPMENT AND VALIDATION OF THE U.S. ARMY LEARNING ORGANIZATION ASSESSMENT AND REPORT

CONTENTS

	Page
INTRODUCTION	1
The U.S. Army Learning Organization Maturity Model	1
Measuring Learning Organizations.....	2
Research Objective	4
DEVELOPMENT OF THE ASSESSMENT AND REPORT	4
Developing the Assessment	4
Developing the Report	6
VALIDATING THE ALOA	7
Identifying Measures	7
Administering the ALOA	11
Learning Organization Maturity Report Feedback Survey.....	20
CONCLUSIONS.....	23
Limitations and Future directions	23
Closing Remarks.....	25
REFERENCES	26

APPENDICES

APPENDIX A. ALOMM INDICATORS	A-1
APPENDIX B. DRAFT AND FINAL ALOA (72 ITEMS TO 69 ITEMS)	B-1
APPENDIX C. LOMR EXCEL MACROS.....	C-1
APPENDIX D. EXAMPLE LEARNING ORGANIZATION MATURITY REPORT.....	D-1
APPENDIX E. PROJECT SUMMARY.....	E-1
APPENDIX F. DEMOGRAPHICS	F-1
APPENDIX G. ALOA FEEDBACK SURVEY.....	G-1
APPENDIX H. AUSTRALIAN ARMY LO QUESTIONNAIRE (ALOQ).....	H-1

	Page
APPENDIX I. ALOA RELIABILITY FOR THE INITIAL AND MODIFIED ALOA.....	I-1
APPENDIX J. CONFIRMATORY FACTOR ANALYSIS.....	J-1
APPENDIX K. EXPLORATORY FACTOR ANALYSIS OF DIMENSIONS 2 AND 3	K-1
APPENDIX L. EXPLORATORY FACTOR ANALYSIS OF DIMENSIONS 4 AND 5.....	L-1
APPENDIX M: FACTOR LOADINGS FOR THE FINAL ALOA	M-1

LIST OF TABLES

TABLE 1. MAPPING OF THE ALOQ TO THE ALOMM.	9
TABLE 2. MODIFIED ALOQ RELIABILITIES AGAINST THE ALOA.....	14
TABLE 3. CORRELATIONS BETWEEN ORIGINAL AND MODIFIED ALOQ SCALES.....	15
TABLE 4. INTER-CORRELATIONS BETWEEN ALOA AND ALOQ.	15
TABLE 5. FINAL ALOA RELIABILITY COEFFICIENTS AND CORRELATIONS	18
TABLE 6. SUMMARY OF ALOA FEEDBACK (LIKERT).....	20

LIST OF FIGURES

FIGURE 1. ARMY LEARNING ORGANIZATION MATURITY MODEL.....	1
FIGURE 2. MODIFIED ALOA FACTOR LOADINGS	19
FIGURE 3. LEADER FEEDBACK SURVEY	21

DEVELOPMENT AND VALIDATION OF THE U.S. ARMY LEARNING ORGANIZATION ASSESSMENT AND REPORT

Although the U.S. Army has self-identified as a Learning Organization (LO) for decades, there remained a gap in guidance on what a U.S. Army LO was and how leaders could transform their organizations into LOs. To address this gap, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) conducted research to understand LOs in the U.S. Army. Preliminary research results indicated U.S. Army members could benefit from guidance on LOs (Calton, 2018), and led to the development and validation of the U.S. Army Learning Organization Maturity Model (ALOMM; see Figure 1; Calton et al. 2021).

Figure 1

The U.S. Army Learning Organization Maturity Model (ALOMM)

Dimension 1: Cultivation of Learning Support	
Maintaining a culture that is conducive to continuous learning for individuals and teams by providing resources, removing obstacles and incentivizing and modeling behaviors that support learning.	
Attribute 1	Communicates the value of learning, new ideas and open dialogue across all levels of the organization.
Attribute 2	Recognizes and rewards initiatives to generate and share new knowledge.
Attribute 3	Encourages learning that promotes continuous self- and organizational- improvement.
Attribute 4	Provides resources and opportunities to enable learning and development.
Dimension 2: Orientation toward a Shared Future	
Creating a shared organizational vision and a common understanding of how learning is used to collectively achieve the vision.	
Attribute 1	Collaborates to define strategies for learning to achieve shared goals.
Attribute 2	Demonstrates a unified purpose for how learning is used to create change and achieve a shared organizational vision.
Attribute 3	Works together to integrate learning into daily operations.
Dimension 3: Exploration of New Perspectives	
Searching continuously for new perspectives and information and challenging current thinking to give rise to improvements.	
Attribute 1	Conducts ongoing assessment of the organization to determine where learning is needed.
Attribute 2	Challenges current practices and generates new methods for achieving objectives.
Attribute 3	Applies new ideas that lead to innovation.
Attribute 4	Builds a foundation of trust to encourage generation and implementation of new knowledge.
Dimension 4: Synchronization of Capabilities	
Aligning capabilities and resources to achieve interdependencies that promote learning and enhance effectiveness.	
Attribute 1	Integrates capabilities across the organization to achieve a common goal.
Attribute 2	Leverages diverse perspectives and experiences to create value for the organization.
Attribute 3	Considers the complex relationships among environmental and organizational elements when identifying courses of action.
Dimension 5: Management of Organizational Knowledge	
Engaging in ongoing activities to identify, capture, store, transfer and apply knowledge to address knowledge gaps and optimize performance.	
Attribute 1	Maintains processes for knowledge exchange and continuity of operations.
Attribute 2	Connects communities of interest to promote knowledge exchange and integration.
Attribute 3	Leverages systems to share knowledge that aligns with work requirements.
Attribute 4	Captures and disseminates lessons learned.

This functional model¹ describes what U.S. Army LOs look like and what they do, and represents the first empirical attempt to understand LOs specific to the U.S. Army. Leaders involved in the validation efforts of the ALOMM expressed interest in further research that would support their ability to assess their organizations on the continuum of learning specified by this model. However, our extensive literature review aimed at identifying these measures indicated no appropriate assessments existed that would specifically measure the maturity of U.S. Army LOs (especially not as defined by the ALOMM).

Measuring Learning Organizations

The LO literature consistently agrees that LOs are aspects of a collective social organization. Although there is no consensus regarding the level of analysis and measurement of LOs (e.g., individual, team, unit, organization), experts agree the collective nature of LOs is essential to ensure the organization adopts the learning initiatives and that its members exhibit the associated learning behaviors. The maturity of each learning initiative should be assessed at the organizational-level while considering how learning is measured at each level of the organization. Below, we outline the measurement research key to informing the current research.

The Dimensions of the Learning Organization Questionnaire (DLOQ) was developed and validated as a means of assessing an organization's status as an LO for the purpose of helping to guide change (Yang et al., 2003). The DLOQ measures important functions in an organization's climate, culture, systems, and structures that have been found to influence individual learning. The DLOQ includes seven dimensions: (a) Create continuous learning opportunities, (b) Promote inquiry and dialogue, (c) Encourage collaboration and team learning, (d) Create systems to capture and share learning, (e) Empower people toward a collective vision (f) Connect the organization to its environment, and (g) Provide strategic leadership for learning.

Since the creation of the DLOQ, over 200 companies have used it to determine their status as an LO and assess their relative strengths and weaknesses in particular LO dimensions. However, the DLOQ is limited by its primary focus on capturing perceptions of employee support towards learning that excludes the experiential mechanisms for learning (e.g., on-the-job experiences, failures/lessons learned, mentoring, training). Given that the objective of the current effort is to provide Army organizations with a means of assessing and tracking LO maturity including both perceptions and mechanisms, our focus will be to provide Army organizations with a more comprehensive representation of their maturity as LOs and their ability to adapt to changing demands during periods of transition. To provide a more comprehensive representation of an LO, the ALOA must not only utilize what the DLOQ is doing well (i.e., employee support towards learning), but also go above and beyond what the DLOQ is capturing by considering experiences as mechanisms for learning.

Another study that provides valuable measurement insight is the Learning Organization Survey (LOS) by Garvin et al. (2008). The LOS was designed to assess and compare the learning that occurs within and across organizations and is divided into three key sections. The first

¹ A functional LO model describes the processes and activities U.S. Army organizations engage in as an LO. To describe U.S. Army LOs by what they do, the ALOMM is comprised of two components: dimensions and attributes.

section, Supportive Learning Environment, assesses psychological safety, appreciation of differences, openness to new ideas, and time for reflection. The second section, Concrete Learning Processes and Practices, assesses experimentation; information collection, analysis, education and training; and information transfer. The final section examines leadership in the organization to determine if it reinforces learning behavior. The LOS scores these three areas of performance and provides a framework for an organization to compare against other organizations and benchmarks. While the three constructs in the LOS did not appear to pointedly overlap with the content of the ALOMM, this research was important in the development of the U.S. Army learning organization assessment (ALOA). First, the structure of the LOS informed the development of the learning maturity stages in the U.S. Army. Specifically, like the LOS, the ALOA uses a scaled scoring system, though the ALOA outputs descriptive categories rather than numeric scores to encourage use of the assessment for developmental purposes rather than competitive or even selection purposes. Second, unlike the LOS, which is not publicly available, the present research will ensure the assessment is widely available to and interpretable by U.S. Army leaders to use for their personal development purposes.

The next important measure in the literature was the Organizational Learning Survey (OLS; Goh & Richards, 1997). Through extensive literature review of organizational learning from a managerial perspective, Goh and Richards proposed five important LO characteristics and management practices: (a) Clarity of mission, (b) Leadership commitment and empowerment, (c) Experimentation and rewards, (d) Transfer of knowledge, and (e) Teamwork and group problem solving (1997). Importantly, in developing the OLS, the researchers rationalized the importance of both individual and group learning, and the necessity of learning being fed back into the organization. Validation results indicated the 21-item OLS was a valid and reliable tool for managers to use in the public and private sector. While the dimensions in this measure did not overlap entirely with the dimensions of the ALOMM (e.g., leadership was present throughout the ALOMM, not as a separate category), this research did provide important insights into developing the ALOA and reinforced support for our normative approach towards understanding and assessing LOs in the U.S. Army.

We also reviewed measures specific to military organizations and identified two relevant measures. The first measure was the U.S. Air Force Air Mobility Command (USAF AMC) Learning Organization Capability Maturity Model (LOCMM; Cronin et al., 2014). Building on a comprehensive review of scientific research and best practice models for measuring maturity levels of an LO, Cronin et al. (2014) identified five core dimensions specific to AMC to measure their progress as an LO. Cronin et al. (2014) then developed an assessment strategy, created instruments, and collected qualitative and quantitative data to form a baseline assessment of the organization's current LO maturity level across the LOCMM dimensions. The various metrics gathered for this effort not only indexed LO maturity across the dimensions of the LOCMM, but were also linked to the organization's strategic objectives. By incorporating a strategic vision for learning, the LOCMM demonstrates how important it is for organizations to understand how advancements in LO maturity will foster long-term organizational success.

The second military-specific measure we identified, and the measure most closely aligned with our research on U.S. Army LOs, was the Australian Army Learning Organization Questionnaire (ALOQ; Stothard, 2014). In 2014, Stothard reviewed social sciences literature and

identified the LO characteristics from four LO instruments², then evaluated those characteristics for validity and reliability. The DLOQ and OLS were found to have the highest levels of validity and reliability, and were subsequently used to inform the construction of the ALOQ. The ALOQ was administered with a sample of 390 Australian Army personnel, from E3-O5 (U.S. Armed Forces equivalents) and psychometric analysis of these data demonstrated the ALOQ was a reliable and valid measure of LO functions, suitable for administration within the Australian Army. The applicability of the Australian Army LO context to the U.S. Army LO context must be considered as part of the current research effort. Ultimately, most important to the current effort, Stothard's (2014) validated assessment represents the measure most likely to provide some evidence of convergent validity for the ALOA.

Research Objective

Currently, no LO assessments exist that are appropriate for measuring learning maturity specific to the dimensions of the ALOMM. Therefore, the objectives of this research were twofold: a) to develop and validate a U.S. Army Learning Organization Assessment (ALOA), and b) to develop and evaluate a Learning Organization Maturity Report (LOMR) that is easily generated and summarizes organizational-wide ALOA results in useful and meaningful way.

Development of the Assessment and Report

Developing the Assessment

The ALOA was developed to assess U.S. Army organizations' level of learning maturity across each component of the ALOMM. The metrics gathered by the ALOA were intended to inform leaders of their organization's learning strengths and areas in need of improvement. Learning maturity is as a continuum from forming at the most fundamental level of maturity, to optimizing as the most mature.

The development of the draft ALOA included the following four major steps:

- Step 1. Developing indicators for each attribute of the ALOMM,
- Step 2. Indicator Q-sort: Assessing the validity of ALOMM indicators,
- Step 3. Drafting ALOA items, and
- Step 4. ALOA Item Q-sort: Assessing the validity of the ALOA items and finalizing the draft ALOA.

Step 1. Developing Indicators.

Using the ALOMM, the research team worked together to compile indicators of maturity for each ALOMM attribute. *Indicators* in this research were defined as "categories of metrics that can be used to uniquely index LO maturity across each attribute in the ALOMM." Through discussions, the researchers narrowed the indicators down to the two most theoretically important indicators per attribute. These indicators provided the foundation upon which specific

² These four instruments were: 1. the Dimensions of the Learning Organization Questionnaire (Yang et al., 2003), Organization Learning Survey (Goh & Richards, 1997), Learning Organization Survey (Garvin et al., 2008), and Learning Environment Questionnaire (Armstrong & Foley, 2003).

ALOA items could be developed. Thus, while developing and measuring indicators were not a specific goal of the ALOA, specification of these indicators served as a necessary practical step in identifying what should be measured to index LO maturity in accordance with the model.

Step 2. Indicator Q-Sort.

A Q-sort is an iterative process where individuals sort cards that represent items into baskets that represent constructs (Nahm et al., 2002), which is commonly used in attachment research (Waters, 1987). In attachment research, the Q-sort uses the child as the overall construct where parents sort behaviors of their child to determine attachment style based on which behaviors most and least accurately describe their child (e.g., DeMulder et al., 2000). As such, to ensure the developed indicators accurately represented their intended attributes, we conducted a Q-sort of the indicators to the attributes using the methods outlined in Nahm et al., (2002). The research team constructed a Q-sort tool that contained the dimensions and their respective attributes, and a randomized list of the indicators from the model. Three participants with a background in personnel psychology, who had no prior knowledge of the content of the ALOMM, were provided with instructions that described the purpose of the Q-sort and defined the dimensions and attributes of the ALOMM. In the Q-sort document, the five dimensions of the ALOMM and their associated attributes were presented as column headers while indicators were provided in a separate list. The participants' task was to organize the indicators under each attribute based on their judgment of which attribute an indicator would best measure. Participants were instructed that each indicator should be used only once, and each attribute should only contain two indicators. Participants reviewed the dimensions, attributes and indicators to develop a gestalt understanding of the ALOMM, and then assigned the indicators to attributes based on their understanding of both.

Results. A 'hit ratio' was calculated for each of the 36 indicators to determine the proportion of participants who sorted a given indicator to its intended attribute. When the hit ratio did not meet the threshold of 0.67 (i.e., two out of three participants sorted the indicator as intended), that indicator was flagged for revision. Participants were encouraged to provide input regarding points of confusion. Based on the results of the Q-sort and the qualitative input from participants, language was slightly revised on six of the 36 indicators to clarify and better align the indicators with their intended attributes. These indicators then served as the basis for developing draft items for the ALOA (see Appendix A).

Step 3. Drafting ALOA items.

The research team developed three assessment items aligned to each of the 36 indicators of the ALOMM, for a total of 108 draft items. The goal was to ultimately use the two best performing items for each indicator, thus the research team anticipated removing at least one item for each indicator based on the results of step 4 of the ALOA development process (described below).

Step 4. ALOA Item Q-sort.

To establish preliminary content validity of the draft items, the research team administered a second Q-sort exercise wherein participants mapped the draft items to ALOMM attributes. The same method used in the indicator Q-Sort was used for the item to attribute Q-sort. The research team constructed a Q-sort tool that contained the dimensions and attributes and a randomized list of the ALOA items. Three additional internal personnel with a background in personnel psychology who had no previous knowledge of the content of the ALOMM or ALOA were recruited to participate in the Q-sort exercise. Participants were provided with instructions that described the purpose of the Q-sort, definitions of the ALOMM dimensions and attributes, along with their associated indicators, and the Q-sort spreadsheet. The five dimensions of the ALOMM and their associated attributes were presented as column headers while the 108 draft ALOA items were provided in a separate, randomized list. Participants' individually mapped each of the 108 draft ALOA items to what they believed to be its intended attribute. Participants were instructed to map a total of six items to each of the 18 attributes and were encouraged to provide feedback on the wording of the items for measurement clarity and precision.

Results. A 'hit ratio' was calculated for each of the 108 draft items to determine the proportion of participants who sorted a given item to its intended attribute. Fifty items met the hit rate threshold of 0.67 (i.e., two out of three participants sorted the item with its intended attribute). Based on feedback from participants, six of these 50 items underwent minor wording revisions to clarify and distinguish them from other attributes and to de-conflict terms known to have specific, alternative meanings in the Army. Items that did not meet the hit ratio (i.e., misses), were analyzed and discussed with the participants and members of the research team to achieve a shared understanding of the reason participants sorted the item under an unintended attribute. This discussion identified problematic items that were removed from the draft list, and informed revisions to "missed" items to clarify their linkage with the intended attribute. The research team revised 22 items which were subsequently presented to Q-sort participants to confirm the revisions resolved the points of confusion. Collectively, this step of the research resulted in a draft ALOA comprising 72 items (four items for each of the 18 attributes). This 72-item instrument (see Appendix B) was the focus of the construct validation efforts described in the next section.

Developing the Report

After developing the ALOA, our next objective was to develop a report that would consolidate the data from the ALOA into an easy to read, digestible format. When the ALOA is implemented and made available to Army organizations, a critical aspect of the assessment process is organizational leaders' receipt of the ALOA results in the form of a Learning Organization Maturity Report (LOMR). To provide insights to organization leaders regarding their standing as Army LOs, the research team developed a report generator that provides leaders with summary ALOA results at the dimension, attribute and item level. LOMRs are generated by a custom-built MS Excel macro (see Appendix C) using cleaned datasets for each organization. LOMRs comprise four main sections (overview, how to use this report, overall maturity

summary, and attribute level results) and the name of the leader or their organization (see Appendix D).

Validating the ALOA

The next step in developing the ALOA was to gather and evaluate evidence of its validity. Per the society for industrial and organizational psychology (SIOP) principles, “professional judgment should guide the decisions regarding the sources of evidence that can best support the intended interpretation and use” (2018, p. 5). Thus, the following five steps were followed in the process of establishing preliminary validation evidence of the ALOA:

1. Identifying measures for convergent validity,
2. Administration of the ALOA and similar measure (ALQ) to U.S. Army participants,
3. Eliciting feedback from participants, and
4. Analysis of all data and final refinements as necessary.

Identifying Measures

The first step was to identify measures for convergent validity. It is important to bear in mind that convergent validity is just one element of a broader system of validity evidence. Validity is “the degree to which evidence and theory support the interpretations of test scores for proposed uses of tests” (AERA et al., 2014, p. 11). Validity is an inference based on theory and an accumulation of evidence. Researchers use the overall accumulation of evidence to form evaluative judgments in terms of the underlying theory; and there are multiple forms of evidence (e.g., content, construct; see also Messick, 1995; Murphy, 2009; Schmitt et al., 2017). Thus, all forms of evidence lead to the overall evaluation. In addition, the SIOP Principles define validity as, “a unitary concept with different sources of evidence contributing to an understanding of the inferences that can be drawn” (SIOP Principles, 2018, p. 4).

Given this modern perspective on validity, we needed to establish the content of our domains. Content validity is, in essence, articulating the theory that underlies the construct, items, and measure. Thus, establishing content validity is made possible through the use of clear construct definitions. These clear construct definitions were derived for each attribute of the ALOMM during its development. Based on the theory underlying the ALOA, we were then able to identify measures specifically to help support convergent validity. Because the ALOA is a new measure and its constructs do not overlap with constructs of existing measures in their entirety, we sought to find items or scales with sufficient *content* overlap to establish convergent validity. Thus, it was important to look at the content of the items of related scales (e.g., the ALQ), and not rely on the scale labels or construct labels to determine this intersection. Specifically, we sought to identify items or scales (as opposed to entire measures) that are closest to what the ALOA items and scales were intended to measure (R. Ployhart, personal communication, April 24, 2020).

Importantly, the ALOA is purpose-built for use in the U.S. Army and represents a “first-of-its-kind” instrument. As such, there were no existing measures with a one-to-one correspondence between their measured constructs and the constructs measured by the ALOA.

We evaluated the content of existing measures and identified the ALOQ (Stothard, 2014) as the closest approximation of a parallel measure for the ALOA in terms of its content and underlying theory. Yet even the ALOQ constructs do not align perfectly with the constructs present in the ALOA. Thus, without modification, the ALOQ would provide an inadequate basis for establishing convergent validity at the whole-instrument and scale-level in a one-to-one fashion. Because there was no similar measure to use for construct validity, we proceeded based on content validity grounds to utilize items from published scales that would allow us to test whether the ALOA empirically correlates with items that should reflect similar content. It is always possible this method may inflate the evidence of convergent validity because we chose the items. To minimize this risk, scientific care was taken to select items based on expert judgment relating to content per the procedures prescribed by AERA et al., (2014) and the SIOP Principles (2018). Altogether, this represents a suitable approach to obtaining empirical evidence of the ALOA's construct validity (Hinkin, 1998). Thus, the position that "*ALOA items will positively correlate with the selected ALOQ items*" represents a theoretically appropriate, empirically testable (i.e., falsifiable) hypothesis. The 11 constructs of the ALOQ and the ALOMM components with which they are associated are shown in Table 1.

Table 1*Mapping of the ALOQ to the ALOMM*

ALOMM		ALOQ Constructs
Dimension 1: Cultivation of Learning Support		
Maintaining a culture that is conducive to continuous learning for individuals and teams by providing resources, removing obstacles and incentivizing and modeling behaviors that support learning.		
Attribute 1	Communicates the value of learning, new ideas and open dialogue across all levels of the organization.	Strategic Leadership for learning
Attribute 2	Recognizes and rewards initiatives to generate and share new knowledge.	Leadership – empowerment
Attribute 3	Encourages learning that promotes continuous self- and organizational-improvement.	Continuous learning
Attribute 4	Provides resources and opportunities to enable learning and development.	Leadership – empowerment
Dimension 2: Orientation toward a Shared Future		
Creating a shared organizational vision and a common understanding of how learning is used to collectively achieve the vision.		
Attribute 1	Collaborates to define strategies for learning to achieve shared goals.	Collective vision
Attribute 2	Demonstrates a unified purpose for how learning is used to create change and achieve a shared organizational vision.	
Attribute 3	Works together to integrate learning into daily operations.	(No mapping. This ALOMM dimension is unique because it speaks to the feedback loop of translating strategy into operations.)

Table 1 (*continued*).

Mapping of the ALOQ to the ALOMM

ALOMM		ALOQ Constructs
Dimension 3: Exploration of New Perspectives		
Searching continuously for new perspectives and information and challenging current thinking to give rise to improvements.		
Attribute 1	Conducts ongoing assessment of the organization to determine where learning is needed.	Dialogue and inquiry
Attribute 2	Challenges current practices and generates new methods for achieving objectives.	Dialogue and inquiry
Attribute 3	Applies new ideas that lead to innovation.	Innovation and experimentation
Attribute 4	Builds a foundation of trust to encourage generation and implementation of new knowledge.	Dialogue and inquiry
Dimension 4: Synchronization of Capabilities		
Aligning capabilities and resources to achieve interdependencies that promote learning and enhance effectiveness.		
Attribute 1	Integrates capabilities across the organization to achieve a common goal.	Teamwork and collaboration
Attribute 2	Leverages diverse perspectives and experiences to create value for the organization.	Teamwork- diversity
Attribute 3	Considers the complex relationships among environmental and organizational elements when identifying courses of action.	Connection – organization to environment
Dimension 5: Management of Organizational Knowledge		
Engaging in ongoing activities to identify, capture, store, transfer and apply knowledge to address knowledge gaps and optimize performance		
Attribute 1	Maintains processes for knowledge exchange and continuity of operations.	Knowledge transfer
Attribute 2	Connects communities of interest to promote knowledge exchange and integration.	
Attribute 3	Leverages systems to share knowledge that aligns with work requirements.	Systems – capture and share learning
Attribute 4	Captures and disseminates lessons learned.	

Administering the ALOA

Participants.

The next step in validating the ALOA was to administer the survey to U.S. Army organizations, as described below. The level of analysis chosen for this organizational assessment was Company, for several reasons. First, the Company level is the level at which the behaviors in the model could be observed by all subordinates. Levels at the battalion or above may be more difficult for junior members to observe and thus would likely need additional considerations when using this assessment. Second, this level corresponds similarly to the level assessed by the ALOQ (Stothard, 2014). And finally, by assessing the Company level, we are able to capture the learning behaviors of the organization across three levels of organizational leaders that Senge (1990) describes as instrumental for LO success:

1. The first line leader—these are the first level working leaders (e.g., Squad Leaders). These leaders are important for conducting and supervising hands-on work and are often the first level at which learning needs are identified.
2. The network leader—these are leaders who supervise several first line leaders and who are responsible for networking amongst their peers to socialize ideas and learning needs (e.g., Platoon Leaders) that can improve organizational success.
3. The executive leader—these leaders oversee several network leaders and are responsible for setting the organizational vision for learning (e.g., Company Commander) and guiding the organization towards achieving that vision.

Thus, for the purposes of this administration, each of 12 Companies in a single operational Brigade served as the focal organizations for analysis.

Materials.

An online survey was created using Verint Enterprise Feedback Management, for administration with the participating U.S. Army Companies. This survey was estimated to take less than 45 minutes to complete via an emailed, anonymous, common access card enabled link. This survey was comprised of five main parts, presented in the following order:

1. **Project Summary.** This described the research background and nature of their participation in the research (see Appendix E).
2. **Demographic information.** This included participants' rank, organizational affiliation and experience with commanding Company-sized units (see Appendix F).
3. **Draft ALOA.** The draft instrument composed of 72 Likert-type items (4 items per each of the 18 attributes) rated on a 5-point frequency scale ranging from Never (1) to Always (5; see Appendix B).
4. **ALOA feedback survey.** A nine-item feedback survey that immediately followed the ALOA to promote accurate responses while participants' experience with the ALOA was fresh in their minds. The feedback survey captured participants'

opinions and attitudes regarding the clarity, relevance, and utility of the ALOA (see Appendix G).

5. **Australian Army Learning Organization Questionnaire (ALoQ).** As described previously, the ALoQ is a measure of learning organizations developed and validated with the Australian Army by Stothard (2014). The ALoQ has been demonstrated to be reliable (internal consistency $\alpha = .90$; test-retest $r = .77$), content valid, and capable of discriminating between differing organizations (i.e., evidence of discriminant validity). The modified ALoQ was included in the survey to establish convergent validity of the ALOA. This previously described procedure retained only the items deemed most pertinent to the ALOA constructs, both to emphasize content validity and to reduce survey burden. In total, 43 of the 61 ALoQ items were included in this survey (see Appendix H).

Procedure.

The Brigade POC sent invitation emails (prepared by the research team) to each of the Company commanders in the Brigade to distribute to the active duty personnel within their Company. The email invitations included an anonymous link to the online survey that was specific to each Company. Upon following the link, participants were first presented with the informed consent page that described the research background and nature of their participation. Consenting participants then completed the survey sections in the order described above; the survey process was terminated immediately for participants who did not consent. After filling out the demographics, participants were instructed to use their current Company as the organization of reference when completing the survey. Due to the overall survey length, and the risk of survey fatigue, the research team followed best practice of survey research (e.g., Jones et al., 2013) to consistent ordering of the survey sections to ensure the ALOA data were prioritized as these were the most critical for this research.

Results.

Data Cleaning. Data from a total of 1,144 data files (i.e., cases) were screened for insufficient effort in responding (e.g., responding in the same manner across numerous items). There is not an established criterion for how many unvaried responses in row indicates insufficient effort in responding, thus three levels of criteria were assessed to determine removal. The first level was the most conservative with a criterion of 10 consecutive unvaried responses (i.e., 7.8% of the entire survey). This resulted in 866 cases being flagged for insufficient effort (i.e., remaining $N = 278$). The second level was more lenient at a criterion of 24 consecutive unvaried responses (i.e., 18.8% of the entire survey), which resulted in 684 cases being flagged for insufficient effort (i.e., remaining $N = 460$). Finally, the third level was the most liberal at a criterion of 36 consecutive unvaried responses (i.e., 28.1% of the entire survey), which resulted in 629 cases being flagged for insufficient effort (i.e., remaining $N = 515$). The research team made the decision to move forward with the second level (i.e., 24 consecutive unvaried responses) as the first level (i.e., 10 consecutive unvaried responses) resulted in too much data loss and the third level (i.e., 36 consecutive unvaried responses) only produced a small incremental improvement to the amount of data retained when compared to the second level. All

analyses and results reported below were conducted with this clean dataset composed of a total N of 460.

Participants. After data cleaning, the remaining participants ($n = 460$) consisted of 63.26% Junior Enlisted (E1-E4; $n = 291$), 21.74% NCOs (E5-E6; $n = 100$), 5.65% SNCOs (E7-E9; $n = 26$), 1.09% Warrant Officers (WO1-CW3; $n = 5$), 6.96% Company Grade Officers (O1-O3; $n = 32$), and 1.30% Field Grade Officers (O4-O6; $n = 6$). The average participant had a mean of 7.5 months assigned to their current company ($SD = 5.3$ months), with an overall range between 0 and 33 months. Finally, 14 participants indicated they had prior command experience (3.04%) with 420 indicating that they had no prior command experience (91.30%). The remaining participants did not respond to the question ($n = 26$; 5.65%).

ALOQ Reliability. The reliability of the parallel items from the Army Learning Organization Questionnaire (ALOQ) used to evaluate the convergent validity of the ALOA were assessed using Cronbach's alpha. Some subscales contained only one item, so calculating Cronbach's alpha was not feasible in these instances. Table 2 presents the reliability coefficients for these modified ALOQ scales (i.e., Dimensions) and subscales (i.e., attributes). At the subscale level, internal consistency was generally found to be adequate. However, there were two subscales that showed low interrelatedness between items. These included the "D1/A1: Communicates the value of learning, new ideas and open dialogue across all levels of the organization" subscale ($\alpha = 0.04$) and D3/A3: "Applies new ideas that lead to innovation" ($\alpha = 0.40$). Importantly, these are the only two subscales that contain negatively worded (i.e., reverse-scored) items. Robust findings, supported by a large literature, indicate it is common for negatively worded items to have poor item characteristics and form their own factor (e.g., DiStefano & Motl, 2006).

Table 2*Modified ALOQ Reliabilities against the ALOA*

Dimensions and Attributes	N	α	Items
D1: Cultivation of learning support	347	0.87	9
<i>A1: Communicates the value of learning, new ideas and open dialogue across all levels of the organization</i>	369	0.04	2
<i>A2: Recognizes and rewards initiatives to generate and share new knowledge.</i>	355	0.86	3
<i>A3: Encourages learning that promotes continuous self- and organizational- improvement.</i>	-	-	1
<i>A4: Provides resources and opportunities to enable learning and development.</i>	368	0.75	3
D2: Orientation toward a shared future	362	0.88	6
<i>A1: Collaborates to define strategies for learning to achieve shared goals.</i>	365	0.76	3
<i>A2: Demonstrates a unified purpose for how learning is used to create change and achieve a shared organizational vision.</i>	371	0.80	2
<i>A3: Works together to integrate learning into daily operations.</i>	-	-	1
D3: Exploration of new perspectives	344	0.91	13
<i>A1: Conducts ongoing assessment of the organization to determine where learning is needed.</i>	370	0.70	2
<i>A2: Challenges current practices and generates new methods for achieving objectives.</i>	358	0.78	3
<i>A3: Applies new ideas that lead to innovation.</i>	358	0.40	3
<i>A4: Builds a foundation of trust to encourage generation and implementation of new knowledge.</i>	363	0.89	5
D4: Synchronization of capabilities	357	0.84	4
<i>A1: Integrates capabilities across the organization to achieve a common goal.</i>	-	-	1
<i>A2: Leverages diverse perspectives and experiences to create value for the organization.</i>	-	-	1
<i>A3: Considers the complex relationships among environmental and organizational elements when identifying courses of action.</i>	359	0.72	2
D5: Management of organizational knowledge	354	0.93	11
<i>A1: Maintains processes for knowledge exchange and continuity of operations.</i>	-	-	1
<i>A2: Connects communities of interest to promote knowledge exchange and integration.</i>	-	-	1
<i>A3: Leverages systems to share knowledge that aligns with work requirements.</i>	360	0.83	4
<i>A4: Captures and disseminates lessons learned.</i>	359	0.87	5

Note: **D** = Model Dimension, **A** = Attribute, **Items** = the number of ALOQ items being compared to the listed dimensions and attributes.

ALOA Convergent Validity.

To begin evaluating evidence of the ALOA convergent validity (with the ALOQ) we first computed the correlations between the original and modified ALOQ scales (per alignment described in Table 1) at the dimension level using previously published data for this scale (see Table 3; Stothard, 2014). There appears to be high convergent validity between the original and modified ALOQ (mean correlation uncorrected for reliability = .78; $SD = .10$). Thus, the two measures seem to be tapping the same constructs (as expected given the content is the same, just rearranged).

Table 3*Correlations between original and modified ALOQ scales*

	CoL	DInq	TWC	SysC	CoV	COE	StrL	LE	InEx	KnTR	TWD
D1	0.913	0.802	0.515	0.810	0.882	0.787	0.843	0.592	0.781	0.810	0.658
D2	0.779	0.808	0.674	0.816	0.895	0.819	0.891	0.750	0.741	0.827	0.699
D3	0.856	0.951	0.599	0.840	0.865	0.802	0.753	0.609	0.809	0.837	0.663
D4	0.757	0.787	0.567	0.762	0.812	0.919	0.828	0.696	0.769	0.840	0.800
D5	0.844	0.851	0.588	0.934	0.889	0.841	0.830	0.681	0.736	0.918	0.713

Note. All correlations significant at the .01 level (2-tailed). Heading titles correspond with the following constructs from the ALOQ (Stothard, 2014): CoL = Continuous Learning, DInq = Dialogue and Inquiry, TWC = Teamwork and Collaboration, SysC = Systems-Capture and Share Learning, CoV = Collective Visioning, COE = Connection-Organisation to Environment, StrL = Strategic Leadership for Learning, LE = Leadership Empowerment, InEx = Innovation and Experimentation, KnTr = Knowledge Transfer, TWD = Teamwork and Diversity, D1-D5 = Modified ALOQ constructs within each of the five ALOA Dimensions.

Next, we calculated the inter-correlations between the measured ALOA dimensions and measured modified ALOQ scales (see Table 4). This provided positive evidence for the convergent validity of the ALOA with the modified ALOQ (mean correlation uncorrected for reliability = .69; *SD* = .09). Pearson *r* revealed the ALOQ constructs and the ALOA attributes were all significantly positively correlated (all *r* = .47-.74, all *p* < .05) indicating that the ALOA is measuring the same overall construct (i.e., learning organizations) as the ALOQ.

Table 4*Inter-correlations between ALOA Dimensions and Modified ALOQ*

	CoL	DInq	TWC	SysC	CoV	COE	StrL	LE	InEx	KnTR	TWD
D1	0.728	0.721	0.473	0.731	0.785	0.685	0.733	0.643	0.606	0.709	0.595
D2	0.732	0.732	0.485	0.754	0.773	0.705	0.712	0.624	0.635	0.750	0.614
D3	0.768	0.767	0.484	0.767	0.820	0.739	0.742	0.639	0.655	0.769	0.638
D4	0.726	0.714	0.469	0.754	0.792	0.735	0.729	0.611	0.653	0.768	0.646
D5	0.760	0.721	0.474	0.782	0.811	0.744	0.746	0.635	0.659	0.764	0.626

Note. All correlations significant at the .01 level (2-tailed). Heading titles correspond with the following constructs from the ALOQ (Stothard, 2014): CoL = Continuous Learning, DInq = Dialogue and Inquiry, TWC = Teamwork and Collaboration, SysC = Systems-Capture and Share Learning, CoV = Collective Visioning, COE = Connection-Organisation to Environment, StrL = Strategic Leadership for Learning, LE = Leadership Empowerment, InEx = Innovation and Experimentation, KnTr = Knowledge Transfer, TWD = Teamwork and Diversity, D1-D5 = The five ALOA Dimensions.

Summary of ALOA Convergent Validity. Overall, there is strong evidence for convergent validity of the ALOA and modified ALOQ. The correlations between the ALOA and modified ALOQ are large and approximately as strong as those for the two versions of the

ALQ. One noteworthy caveat is that the convergent validities are lower for *Collaboration* and *Leadership and Empowerment*. The cause of this trend cannot be determined from the present data and thus, future research may seek to investigate whether this finding is replicable. In addition, future research should investigate if removal of those variables strengthens the convergent validity evidence. Also note that the correlations reported here are uncorrected for unreliability. The correlations would only be higher after correction and provide even stronger support for the convergent validity of the ALOA with the modified ALQ. In other words, the correlation estimates presented in Tables 3 and 4 should be interpreted as the lower-bound estimates of convergent validity. In sum, the differences between the two versions of the ALQ are modest overall, evidence of convergent validity is present across the ALOA and ALQ regardless of which version of the ALQ is used.

ALOA Confirmatory Factory Analysis (CFA).

Because of the theory underlying the ALOM, we had strong a priori assumptions regarding the factor structure of the model. Therefore, we first conducted a CFA to assess the hypothesized measurement model (see Appendix J) via a second-order CFA using a robust maximum likelihood (MLR) estimator.³ Results from the initial model yielded factor loadings from attribute to dimension that were robust and ranged from .93-.98. Factor loadings from items to attribute were robust as well and ranged from .67-.90. Given that large sample sizes can artificially inflate a chi square value, we used additional indices of fit to evaluate our model. The Root Mean Square Error of Approximation (RMSEA = .03), the Comparative Fit Index (CFI) = .95, and the Tucker-Lewis Index (TLI = .94), all further indicated adequate to good fit (Meyers et al., 2016). These results suggest that the proposed model was supported and provides good representation of the data.

ALOA Internal Validity.

The maximum shared variance (MSV) among the dimensions were examined to assess the validity of the ALOA dimensions as distinct using the results of the CFA (Meyers et al., 2016). To do this, the MSV is compared to the average variance extracted (AVE) per factor such that the MSV is lower than the AVE (Marofi et al., 2020). This examination revealed mutual overlap (i.e., shared variance) of Dimensions 2 and 3, and unidirectional overlap of Dimension 4 with Dimension 5. This suggested the ALOA needed refinement to make the dimensions more distinct. Two approaches were used to address this overlap.

The first approach stemmed from an observation in the responses from the ALOA feedback survey that suggested participants who were newer to the organization could have trouble answering ALOA items accurately. To test this assumption, a *t*-test was conducted using ‘time-in-Company’ as a grouping variable. Data from any participant with less than three months of time in the Company was used to create a “less experienced” group and all other participants’ data were used to create a “more experienced” group. The *t*-test indicted significant mean differences between the less experienced group ($M = 3.63$, $SD = .84$) and the more experienced

³ Based on the tests of normality the MLR was used as it is less sensitive to non-normal data and allows the use of maximum likelihood for missing data. Other techniques (e.g., Satorra-Bentler) require listwise deletion for missing data which would too significantly reduce the present sample size of the dataset.

group ($M = 3.21$, $SD = .86$); $t(459) = 3.70$, $p < .05$. Therefore, the validity of the dimensions as distinct was re-examined using only the experienced group. However, reexamination with this subset of the data did not reduce the shared variance among the dimensions.

The second approach to reducing the shared variance among the dimensions was to conduct an exploratory factor analysis, isolating the problematic dimensions. Promax (oblique) rotation was used under the assumption the factors are correlated to identify which specific items were driving the overlap. Using all the items from Dimensions 2 and 3, the analyses accordingly produced two factors with two of four items from Dimension 3, Attribute 1 loading onto the Dimension 2 factor, and one of four items from the Dimension 2, Attribute 1 loading onto the Dimension 3 factor (See Appendix K). Given that each attribute contained four items, and theoretically reorganizing the items did not make sense, the item that demonstrated the highest loading on the opposing factor was dropped from each attribute (i.e., retaining three of the four items in the identified attributes and ensuring alignment with best practice to have at least three items per scale (Kline, 2015). Using all of the items from Dimension 4 and Dimension 5, the analysis accordingly produced two factors with three items from Dimension 5 loading onto the Dimension 4 factor. Similar to Dimension 2 and Dimension 3, the items driving the shared variance came from the same attribute in Dimension 5. Thus, just as before, the decision was made to drop one item from Dimension 5 Attribute 1 that had the highest loading on the Dimension 4 factor (See Appendix L).

Thus, to remove shared variance three items in total were removed from the ALOA (see Appendix B). After removal of these three items the remaining 69-item measurement model was re-examined (see Appendix I & M). The removal of these three items indicated good fit ($RMSEA = .03$; $CFI = .95$; $TLI = .95$) and reduced shared variance among the dimensions for the ALOA scales (see Table 5). One thing to note, even after item reduction, there was large MSV between the five dimensions of the ALOA (lowest MSV = .867) which potentially indicates that there is either a higher order (third level), global factor for the ALOA or all five factors could be combined into a single factor.

Table 5*Reliability Coefficients and Correlations among Dimensions in Final ALOA.*

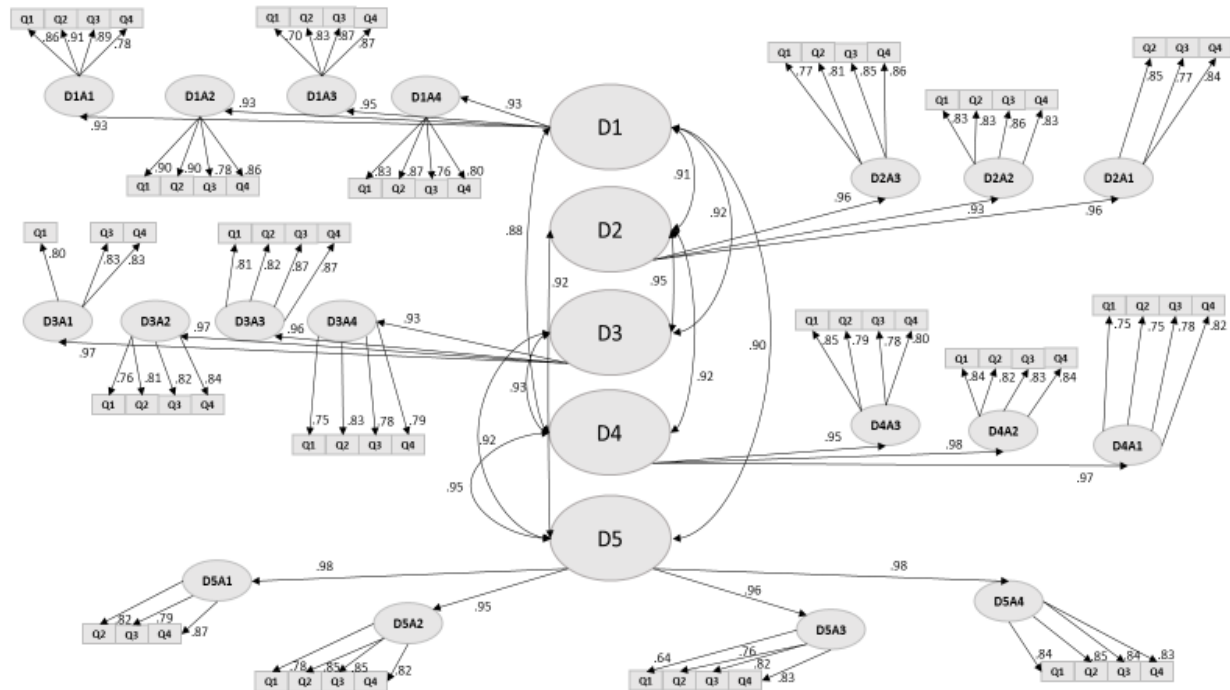
	Reliability Coefficients		Correlations				
	AVE	MSV	D1	D2	D3	D4	D5
D1	0.873	0.867	0.934				
D2	0.904	0.901	0.905	0.951			
D3	0.915	0.901	0.919	0.949	0.957		
D4	0.904	0.899	0.880	0.924	0.934	0.951	
D5	0.932	0.899	0.896	0.918	0.923	0.948	0.965

Note. D = dimension. AVE = average variance extracted and represents the amount of variance that is captured by the dimension in relation the variance associated with error. MSV = the squared highest correlation between the constructs.

Figure 2 represents the model after removal of the three items identified above as driving shared variance among the dimensions. The factor loadings depict the strength of the correlations of the dimensions with attributes and the attributes with the ALOA items. Squared factor loadings indicate the amount of variance of an item (i.e., the observed factor) that is explained by the attribute or dimension (i.e., the latent factors). Generally speaking, factor loadings should be .5 or higher but ideally .7 or higher (Hair et al., 2010). Factor loadings greater than 0.7 can be considered to indicate a strong association between variables (Hair et al., 2010). For example, an attribute-to-item loading of .7 would indicate that the latent factor (the attribute) explains 49% of the variance in the item with 51% of the rest of the variance being explained by error. If a factor loading falls below .7 it indicates that more of the variance in the item is being explained by error than by the factor. After the final model was determined with item removal, the internal consistency of the ALOA was examined via Cronbach's α , and was within acceptable ranges across attributes ($\alpha = .86-.92$) and across dimensions ($\alpha = .95-.97$; See Appendix I).

Figure 2

Final ALOA Factor Loadings



Note. D = Dimension, A = Attribute, q = question/assessment item. Numbers on arrows represent squared factor loadings.

ALOA feedback Survey.

A summary of responses to each of the Likert ALOA feedback items is shown in Table 6. Participants who indicated disagreement or neutral responses to the ALOA feedback items above were prompted to provide suggestions for improving the ALOA. Overall, only 3% (13 of 456 participants) of participants found issue with the questions. A review of the suggestions revealed no actionable comments that would identify an item for removal from the ALOA (i.e., the comments were more general and not item specific). Suggestions for improving the ALOA were reviewed and analyzed for themes by the research team. The three themes identified were that some items seemed too similar and that the survey could, therefore, be shortened, that the focal behaviors mentioned in the items are not observable, and that there were (unspecified) items that should be worded more clearly.

Table 6*Summary of ALOA Feedback via Likert-Type Items*

Item	Item Text	Mean	% Agree	% Neutral	% Disagree	N
1	The ALOA instructions are clear enough that I understand what is expected of me in responding to the ALOA.	3.9	75%	20%	5%	445
2	The ALOA items are clear enough that I understand what they are asking.	3.9	76%	20%	5%	448
3	The ALOA items address behaviors that can be easily observed (as opposed to inferred) in my organization.	3.9	74%	23%	5%	456
4	The ALOA items address behaviors that are relevant to my job in the U.S. Army.	3.9	72%	23%	5%	450
5	Demonstrating the behaviors captured in the ALOA is critical to the future success of my organization.	3.9	71%	25%	5%	451

Note. Differences in *N* are due to skipped responses. Percentages not totaling 100% represent rounding to whole numbers. Mean is based on a 5-point scale (1 – Strongly Disagree to 5 – Strongly Agree). % Agree includes “Agree” and “Strongly Agree” responses. % Disagree includes “Disagree” and “Strongly Disagree” responses.

Learning Organization Maturity Report Leader Feedback Survey (LFS)

The next step in assessing the end-to-end ALOA process was to evaluate the LOMR. Because the LOMR is the key output of the assessment process and the leaders’ main source of information regarding where their organization stands in terms of maturity across the components of the ALOMM, verification of the value and utility of the LOMR is a necessary step to ensuring the ALOA is ready for implementation. Twelve company commanders (Captains) of the 12 organizations that participated in the ALOA validation were invited to respond to the LFS. Ten of the 12 leaders responded for a response rate of 83%.

Materials and Methods.

Following administration of the ALOA, each commander was sent an encrypted email with the LOMR specific to their company and a digital link to the LFS (developed in Verint). The LOMRs were produced using the cleaned and screened dataset described previously. Company commanders were asked to respond to the LFS after reviewing their LOMR (see Figure 3). The LFS was intended to capture leaders’ attitudes and opinions regarding the utility of administering the ALOA and receiving their LOMR. The LFS consisted of an informed consent page, demographic questions, and three Likert-type items that solicited responses on a 5-point agreement scale ranging from (1) Strongly Disagree to (5) Strongly Agree (see Figure 2). Responses ranging from (1) Strongly Disagree to (3) Neither Disagree nor Agree triggered prompts asking participants to provide written feedback to help improve the ALOA and LOMR.

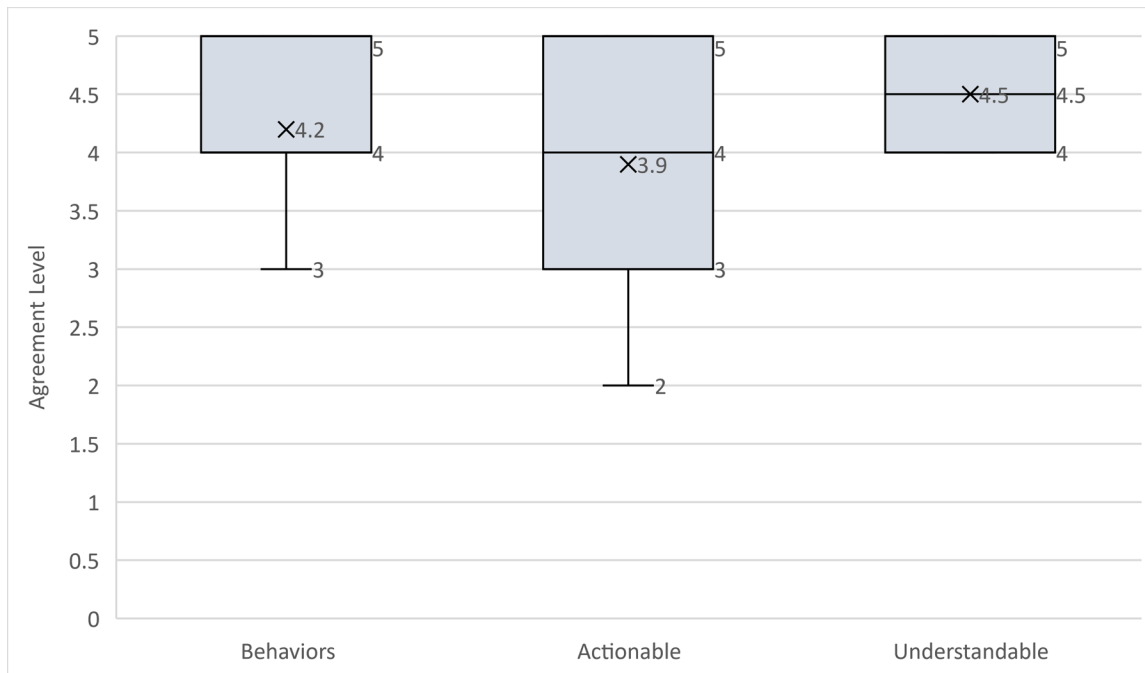
Lastly, there were two open-ended questions presented to all participants soliciting suggestions for improvement, general feedback, and anticipated benefits from the ALOA and its results. The LFS took less than ten minutes to complete.

Results.

Analysis of the three Likert-type items from the LFS are shown in Figure 3.

Figure 3

Leader Feedback Survey Results



Note. Summary of quantitative results from the three-question leader feedback survey about their individual Learning Organization Maturity Reports (LOMRs; $N = 10$). Agreement is represented on a scale ranging from (1) strongly disagree, to (5) strongly agree. Maximum reported score was a 5 (strongly agree), lowest scores are indicated by the minimum bar at the bottom of each box plot. Horizontal bars within the boxes indicate medians. “x” indicates means in the boxes. Each box represents quartile 1 on the bottom, and quartile 3 on the top. **Behaviors** = “The ALOA items address behaviors that reflect the attributes in the Army Learning Organization Maturity Model,” **Actionable** = “Administering the ALOA in my organization has helped me identify actionable steps for improving the organization,” and **Understandable** = “The results presented in the learning organization maturity report were easy to understand.”

For the first item above, one respondent indicated a neutral response (all other respondents indicated agreement or strong agreement). When prompted to provide suggestions for how to improve the ALOA, the respondent commented that many of the questions were “wordy” and may not apply to junior enlisted Soldiers. This respondent suggested making the

ALOA items more concise. This aligns with one of the themes derived from the results of the ALOA feedback survey (though that theme is based on a small subset of the overall sample).

In response to the second item above, one respondent indicated disagreement and suggested that including best case scenarios or examples would help leaders identify actionable steps for improving their organization. Presumably, the respondent was referring to the inclusion of scenarios and examples in the LOMR. Thus, while this goal was out of the purview of the current research, it seems as though some leaders would benefit from additional, more detailed guidance on how to use the results in the LOMR to identify concrete steps they can take to advance their organization's maturity as an LO.

In response to the third item above, one respondent indicated a neutral response (all other responses indicated agreement or strong agreement). This respondent further commented on nuances within their particular Brigade and how different personnel often "belong" to one Company but support another. The respondent commented that, in such instances, ALOA respondents may not be sure which organization to use as the referent.

Next, in open-ended format, the LFS asked respondents to describe any observed or anticipated benefits to their organization associated with administering the ALOA and receiving an LOMR. Thematic analysis of these data indicated organizational leaders saw an ability to identify areas for improvement in their organization as one benefit of administering the ALOA and receiving an LOMR (e.g., *"helped highlight what is and is not working within my organization,"*). A second anticipated benefit of receiving a LOMR identified by the respondents was that it acknowledged what the organization was doing well (e.g., *"it was great to see how much of the unit thinks we are well focused on resourcing and create a positive learning environment,"*). The third theme identified in leaders' feedback was that receiving an LOMR can promote LO behaviors such as interdependent work with other parts of the larger organization and learning from others (e.g., *"provides feedback to myself and the Soldiers on the benefits of an affiliative relationship when it comes to the direction of the Company initiatives and accomplishment of the mission,"*).

Finally, the last question of the LFS asked leaders to provide any additional feedback that was not covered in their responses to other questions. The primary theme emerging from responses to this question was that constant organizational change and personnel turnover make it difficult to obtain an accurate picture of LO maturity which in turn adds difficulty to building a true LO in the U.S. Army. Other respondents used this catch-all question to comment further on the benefits of administering the ALOA and LOMR for helping leaders identify the strengths and needs of their organization in terms of its standing as an LO. Interestingly, elements of the general comments again suggested that administering the ALOA and receiving an LOMR can promote LO behaviors (e.g., *"this indicates that I should reach out to [other] commanders to see what we are doing right"*).

In sum, after minor modification, preliminary validation evidence indicates the 69-item ALOA is capable of indexing learning maturity as defined by the ALOMM. Additionally, the LOMR was valued by leaders as an easy way to identify areas of learning maturity in their organizations and areas in need of improvement. Finally, leaders valued the end-to-end model to

the assessment process, but still desire additional specific guidance on how to best target areas in need of improvement in their organizations. Overall, the evidence herein suggests the ALOA can be used to measure learning maturity in U.S. Army organizations.

Conclusions

The purpose of this research was to 1) develop and provide initial validity evidence for an assessment of U.S. Army LO maturity (ALOA) as defined by the previously developed model (ALOMM) and 2) develop and evaluate a reporting format to consolidate organizational data and help leaders understand where their organization stands in terms of being a U.S. Army LO (Learning Organization Maturity Report, LOMR). To achieve these objectives, the researchers 1) identified behavioral indicators of LO maturity across the dimensions and attributes of the ALOMM, 2) used those indicators of LO maturity to guide the development of the ALOA items, 3) established preliminary evidence of validity for the ALOA by administration of the ALOA and a parallel measure within a nested operational sample, 4) developed and furnished LOMRs to organizational leaders, and 5) gathered feedback throughout on the clarity, usefulness, and utility of the ALOA and LOMR.

There were two key research findings. The first finding was that current evidence suggests the 69-item ALOA is capable of indexing U.S. Army LO maturity as defined by the ALOMM. This suggests U.S. Army organizations can begin using the ALOA to index the LO maturity of their organizations. The second finding was that leaders of U.S. Army organizations valued the end-to-end LO maturity assessment and feedback process but required additional guidance on deriving actionable steps for implementing changes to advance LO maturity in their organizations. These findings suggest the LOMR is valuable as a summary of ALOA results that can be furnished to leaders of U.S. Army organizations to provide insights into the learning maturity of their organization. These findings further suggest organizational leaders would benefit from additional guidance for interpreting their LOMRs to derive actionable steps for maturing as LOs. In particular, leaders are looking for concrete examples of LO strengths and opportunities for maturity.

Limitations and Future Directions

No research is without limitations. This is particularly true of applied research conducted in time-constrained environments with populations that face competing and higher-priority demands. First, while the research conducted here provides initial evidence of validity in an operational U.S. Army organization, there remains a need to verify the utility of the ALOA with a sample drawn from different types and levels of Army organizations. Specifically, the current investigation evaluated the ALOA and LOMR at the Company level from all Companies within a single operational Brigade, a homogeneous sample regarding alignment and perceptions of learning behaviors within their organization. Administration of the ALOA with additional U.S. Army organizations (e.g., multiple Brigades, or institutional units) across U.S. Army branches (i.e., combat arms, combat support, combat service support) will allow the U.S. Army to further assess the factor structure, fit, practical utility, and interpretability of the ALOA and LOMR within this broader, more heterogeneous sample of units.

In contrast to administering the ALOA across a wider sample of organizations, there may be benefits in further examining the assessment's function for Brigade and Battalion level staffs as these entities are likely to have a critical influence on the learning maturity of the organizations they serve. Thus, at this point in its development and testing, the research team assumes the end-to-end LO maturity assessment and feedback process can be effectively implemented at the Company level. Units lower than the Company level may be necessarily limited in the autonomy they have to demonstrate certain LO behaviors – a possibility suggested by open-ended comments in the data. Above the Brigade level, it is important to consider which members of the organization will possess the necessary perspectives to assess LO maturity. For example, if interested in indexing the LO maturity of a U.S. Army Division, junior enlisted Soldiers will likely not have the perspective or observation opportunities to gauge LO behaviors occurring across the Division—thereby providing a somewhat incomplete diagnostic of the Division's learning maturity. This is an unavoidable result of the nested nature of U.S. Army organizations. Thus, while the Company level seem best positioned to benefit from administering the ALOA, the utility of doing so at other levels of U.S. Army organizations hinges upon the inclusion of relevant perspectives and would warrant further investigation.

Where those perspectives reside can be expected to vary from organization to organization, though a good rule of thumb when attempting to measure learning maturity within the Army context at any level, is to go no further than “two levels up or down” (Dubik, 2010). For example, if interested in indexing the LO maturity of an U.S. Army Division, the Battalion commanders and staffs within that Division would be recommended as lowest level of respondents to the ALOA. Similarly, if interested in indexing the LO maturity of a Brigade, the Company commanders and their staff would compose the lowest level respondents. However, this rule of thumb only represents a single individuals' perspective, may not apply to all contexts, and should be viewed with some degree of caution. For example, any Division or Battalion is still comprised of Soldiers at all levels who are nested under levels of Division and/or Battalion leadership. Squad, Platoon, and Company level Soldiers may still provide valid and valuable insights into the learning behaviors that are being exhibited within the Divisions and Battalions they comprise and are nested within.

As data accumulates through repeated administration of the ALOA, efforts should also be made to explore and investigate those areas of potential concern highlighted by the current effort. For example, one of the themes from the participant comments involved the perceived similarity or redundancy of the items. Analysis of the psychometric characteristics and factor structure of the ALOA also revealed overlap between several dimensions and attributes. Although three items were removed, potential concerns may remain. Specifically, a deeper analysis of the factor structure of the ALOA is warranted due to the high interrelationships of the latent dimensions. These high relationships could reveal a potential global factor of the ALOA that fits over the five dimensions. Thus, the accumulation of data from a more heterogeneous sample will allow for research to further investigate the current ALOA structure and determine whether additional revisions might be needed when tested with a larger and more diverse sample.

Another future direction could be to attempt to shorten the ALOA to ease administrative burden and make it even easier for leaders to administer this assessment quickly to get an understanding of the pulse of learning maturity in their organization. It is important to

understand, however, that developing shortened versions of the ALOA could result in a reduced degree of precision. However, this shortened version of the ALOA could be administered as a preliminary diagnostic tool. Depending upon the results of the administration of a shortened assessment (e.g., relatively low or high levels of maturity on particular items or attributes) the leader may decide to use these results in determining whether to administer the full ALOA.

Closing Remarks

As a result of this research, the Army now has available a rigorously developed and model-based method for leaders to identify their areas of learning strength and areas in need of improvement (ALOA) and a method for consolidating organization-wide data into an easy to read, digestible format (LOMR). Moving forward, U.S. Army organizations can now benefit from measuring their current level of learning maturity to pinpoint specific areas for improvement. However, to capitalize on this research and the resulting framework and assessment, it is imperative upon the U.S. Army to promote a learning culture throughout the Force. The U.S. Army should continue to invest in learning-related initiatives while also holding its leaders accountable for modeling the behaviors associated with LOs. A cultural change towards open communication and learning will be necessary moving forward (Freeman & Calton, 2020; Williams, 2007). While learning must be communicated as the responsibility of all organizational members, substantive change in perspective and behavior is dependent upon U.S. Army leadership showing support from the top-down. In the end, with the support of senior leaders and the development of mature U.S. Army LOs, the U.S. Army will be positioned towards overmatch of our competitors via our most priceless asset—our Soldiers and the knowledge they possess.

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Appendix A: ALOMM Indicators

Indicators Associated with Each Component of the ALOMM

Dimensions	Attributes	Indicators
D1 - Cultivation of Learning Support: Maintaining a culture that is conducive to continuous learning for individuals and teams by providing resources, removing obstacles and incentivizing and modeling behaviors that support learning.	A1: Communicates the value of learning, new ideas and open dialogue across all levels of the organization.	<i>Supportive environment:</i> The extent to which learning is valued by leadership, members and the organization. <i>Openness to ideas:</i> The extent to which organizational norms promote open dialogue about new ways to operate and solve problems at all levels of the organization.
	A2: Recognizes and rewards initiatives to generate and share new knowledge.	<i>Encouragement of learning:</i> The extent to which the organization incentivizes its members' initiative to learn, express new ideas. <i>Accountability for growth:</i> The extent to which taking initiative to learn is captured in performance evaluations.
	A3: Encourages learning that promotes continuous self- and organizational-improvement.	<i>Leaders serve as role models:</i> The degree to which leaders pursue opportunities for development and promote ownership of learning. <i>Purposeful learning:</i> The degree of emphasis placed on self-initiated learning that supports individual, team and organizational needs.
	A4: Provides resources and opportunities to enable learning and development.	<i>Learning resources:</i> The level of availability of learning and development infrastructure, tools, and courses to help enhance role performance. <i>Learning opportunities:</i> The extent to which allowances are made, including allocating time and adjusting work to enable members' growth and development.

Indicators Associated with Each Component of the ALOMM

Dimensions	Attributes	Indicators
D2 - Orientation toward a Shared Future: Creating a shared organizational vision and a common understanding of how learning is used to collectively achieve the vision.	A1: Collaborates to define strategies for learning to achieve shared goals.	<i>Collective perspectives:</i> The level of support for contributing ideas regarding a shared vision that is mutually beneficial to all. <i>Inclusive strategic planning:</i> The extent to which all levels of the organization are engaged in setting the vision, strategy, and plan.
	A2: Demonstrates a unified purpose for how learning is used to create change and achieve a shared organizational vision.	<i>Goal-Function correspondence:</i> The extent to which members have a shared understanding of how their functions and the functions of others correspond and contribute to achieving the organization's goals. <i>Learning -Vision correspondence:</i> The extent to which local emphasis on learning corresponds with requirements for achieving the organization's vision.
	A3: Works together to integrate learning into daily operations.	<i>Execution of shared vision:</i> The extent to which members collaborate and use learning to achieve a shared vision. <i>Impact on operations:</i> The extent to which new learnings are integrated to improve work processes and operations
D3 - Exploration of New Perspectives: Searching continuously for new perspectives and information and challenging current thinking to give rise to improvements.	A1: Conducts ongoing assessment of the organization to determine where learning is needed.	<i>Learning assessment:</i> The extent to which the organizational environment is assessed to identify where learning is needed, and change should occur. <i>Learning assessment translation:</i> The extent to which results from organizational assessments of learning needs are linked to organizational goals.
	A2: Challenges current practices and generates new methods for achieving objectives.	<i>Challenging viewpoints:</i> The extent to which there is acceptance for disagreeing or dissenting while still respecting the intent of leadership. <i>Freedom of exploration:</i> The degree to which autonomy is afforded to members to pursue learning that is personally relevant and advances the organization.
	A3: Applies new ideas that lead to innovation.	<i>Attention given to new concepts:</i> The extent to which the organization incorporates creative thinking into decision-making. <i>Application of learning:</i> The degree to which opportunities are provided to members to integrate new concepts and novel perspectives into work or decision-making.

Indicators Associated with Each Component of the ALOMM

Dimensions	Attributes	Indicators
	A4: Builds a foundation of trust to encourage generation and implementation of new knowledge.	<i>Embracing mistakes:</i> The degree to which mistakes are treated as positive growth opportunities. <i>Accepts risks associated with learning:</i> The level of support for thinking creatively, trying new things, and taking initiative.
D4 - Synchronization of Capabilities: Aligning capabilities and resources to achieve interdependencies that promote learning and enhance effectiveness.	A1: Integrates capabilities across the organization to achieve a common goal. A2: Leverages diverse perspectives and experiences to create value for the organization. A3: Considers the complex relationships among environmental and organizational elements when identifying courses of action.	<i>Cross-functional work:</i> The degree to which workflow and processes are synchronized across the organization to achieve common goals. <i>Cross-functional training:</i> The level of availability of cross-functional development opportunities for members to learn and understand how to various organizational functions can be synchronized. <i>Incorporating perspectives:</i> The extent to which the viewpoints of diverse actors are integrated into learning. <i>Tailoring information:</i> The extent to which information is provided in accordance with the needs of recipients. <i>Boundary spanning:</i> The extent to which the organization links its internal networks with external sources of information to determine synergies and conflicts. <i>External collaboration:</i> The extent to which internal capabilities are aligned with external capabilities to leverage industry innovations and maximize effectiveness across domains.

Indicators Associated with Each Component of the ALOMM

Dimensions	Attributes	Indicators
D5 - Management of Organizational Knowledge: Engaging in ongoing activities to identify, capture, store, transfer and apply knowledge and organizational values to optimize performance.	A1: Maintains processes for knowledge exchange and continuity of operations.	<i>Standard procedures for knowledge sharing:</i> Degree to which standard procedures exist for knowledge exchange and continuity of operations. <i>Implementing best practices:</i> Systems, processes, policies and procedures are updated to ensure their relevance, remove obstacles and facilitate operational improvements.
	A2: Connects communities of interest to promote knowledge exchange and integration.	<i>Collaborative learning:</i> The level of encouragement for members' participation in social, cross-organization communities that enhance collaborative learning. <i>Knowledge integration:</i> The extent to which learning is integrated into organizational decision-making.
	A3: Leverages systems to share knowledge that aligns with work requirements.	<i>Knowledge sharing system:</i> The level of consistency in how available information systems are used to share pertinent knowledge. <i>Technology refresh:</i> The extent to which new systems are implemented to enhance learning and operational performance.
	A4: Captures and disseminates lessons learned.	<i>Accessibility of information:</i> The extent to which lessons learned are documented and stored in a way that is discoverable. <i>Sharing best practices:</i> The extent to which best practices are shared across the organization.

Appendix B: Draft and Final ALOA (72 Items to 69 Items)

Dimensions	Attributes	Items
D1 - Cultivation of Learning Support: Maintaining a culture that is conducive to continuous learning for individuals and teams by providing resources, removing obstacles and incentivizing and modeling behaviors that support learning.	A1: Communicates the value of learning, new ideas and open dialogue across all levels of the organization.	1. My organization promotes open dialogue about new ways to operate and solve problems at all levels of the organization. 2. People in my organization are encouraged to share their ideas and opinions. 3. Members of my organization are encouraged to share their insights and discoveries with levels above and below them. 4. Learning is valued by personnel in my organization.
	A2: Recognizes and rewards initiatives to generate and share new knowledge.	1. My organization recognizes and rewards individuals for gaining new knowledge. 2. My organization recognizes and rewards individuals for sharing knowledge. 3. My organization's performance evaluation assesses whether personnel engage in regular self-development. 4. In my organization, personnel who demonstrate initiative by taking ownership of their development are rewarded on their performance evaluation.
	A3: Encourages learning that promotes continuous self- and organizational-improvement.	1. Leaders in my organization pursue opportunities for self-development. 2. Leaders in my organization foster a culture in which personnel take ownership for their individual development. 3. My organization emphasizes self-initiated learning that supports individual, team and organizational needs. 4. There is an expectation in my organization that personnel engage in activities that promote self-development and organizational improvement.
	A4: Provides resources and opportunities to enable learning and development.	1. In my organization, members have access to courses to support the developmental needs of almost every job and work role. 2. My organization provides me learning opportunities that develop skills and abilities required for current and future roles. 3. Leaders in my organization encourage personnel to attend developmental events, even when the person's job is unmanned as a result. 4. Members of my organization are provided time and resources to take part in learning beyond their minimum annual training requirements.

Dimensions	Attributes	Items
D2 - Orientation toward a Shared Future: Creating a shared organizational vision and a common understanding of how learning is used to collectively achieve the vision.	A1: Collaborates to define strategies for learning to achieve shared goals.	~~1. All members of my organization are encouraged to be active participants in creating our organization's vision.~~ 2. Personnel are encouraged to share ideas with one another and their leaders for how to achieve shared goals. 3. In my organization, leaders seek input from personnel at other levels when planning. 4. In my organization, all units are provided an opportunity to contribute to setting the future direction for the organization.
	A2: Demonstrates a unified purpose for how learning is used to create change and achieve a shared organizational vision.	1. It is clear to each person in my organization how their role contributes to achievement of the organization's goals. 2. People in my organization can quickly and succinctly articulate the organization's vision to those outside the organization. 3. People in my organization can describe how their ability to learn and adapt influences the success of the Army mission. 4. People in my organization have a broader understanding of their organization's objectives beyond their individual role.
	A3: Works together to integrate learning into daily operations.	1. Members of my organization collaborate to achieve a shared vision. 2. People in my organization routinely share information to improve daily operations. 3. People in my organization have a common understanding of how to integrate lessons learned to facilitate our vision. 4. People in my organization integrate new learning to improve work processes.
D3 - Exploration of New Perspectives: Searching continuously for new perspectives and information and challenging current thinking to give rise to improvements.	A1: Conducts ongoing assessment of the organization to determine where learning is needed.	1. My organization regularly collects information and input from personnel on the effectiveness of its training and education programs. ~~2. My organization evaluates the benefits of changes to organizational practices.~~ 3. My organization quickly acts to address the developmental needs of personnel. 4. The results from organizational assessments of learning needs are linked to organizational goals

Dimensions	Attributes	Items
	A2: Challenges current practices and generates new methods for achieving objectives.	1. Leaders in my organization value personnel who question assumptions and challenge the status quo. 2. Leaders in my organization encourage personnel to ask questions about the leader's solution or plan if anything seems unclear. 3. Members of my organization are allowed to pursue learning that advances the organization's goals 4. Members of my organization are given freedom to explore learning opportunities.
	A3: Applies new ideas that lead to innovation.	1. Leaders in my organization encourage team members to 'think outside the box' during problem solving and decision-making activities. 2. Leaders in my organization regularly adopt new or creative ideas provided by personnel. 3. In my organization, leaders provide personnel with the leeway to integrate new concepts I have learned into the work environment. 4. Personnel in my organization are provided opportunities to apply new approaches to their work.
	A4: Builds a foundation of trust to encourage generation and implementation of new knowledge.	1. Members of my organization feel safe to share their mistakes with others so that these mistakes can serve as learning opportunities. 2. Leaders in my organization are supportive about honest mistakes. 3. Leaders in my organization share their mistakes. 4. Members of my organization are encouraged to take risks in the pursuit of growth.

Dimensions	Attributes	Items
D4 - Synchronization of Capabilities: Aligning capabilities and resources to achieve interdependencies that promote learning and enhance effectiveness.	A1: Integrates capabilities across the organization to achieve a common goal.	1. It is common that personnel from different parts of my organization are teamed together to address a problem or issue. 2. Members of my organization are encouraged to assist with work in other functional areas of the organization. 3. My organization encourages personnel to participate in cross-training activities to expand their knowledge of various job functions throughout the organization. 4. There are opportunities to learn how the work of different areas of my organization can be coordinated.
	A2: Leverages diverse perspectives and experiences to create value for the organization.	1. My organization integrates diverse viewpoints to understand its learning needs. 2. Even the most junior personnel in my organization are encouraged to provide input to enhance organizational learning 3. Communications within my organization are tailored to ensure understanding by all individuals. 4. Communications within my organization anticipate the information needs of the recipients.
	A3: Considers the complex relationships among environmental and organizational elements when identifying courses of action.	1. My organization integrates information from external knowledge sources into our learning systems and databases. 2. My organization's technology systems facilitate access to information from outside the organization 3. Members of my organization are encouraged to collaborate with experts outside the organization who can assist us in achieving the Army's mission. 4. Members of my organization routinely collaborate with outside organizations in support of the Army's mission.

Dimensions	Attributes	Items
D5 - Management of Organizational Knowledge: Engaging in ongoing activities to identify, capture, store, transfer and apply knowledge and organizational values to optimize performance.	A1: Maintains processes for knowledge exchange and continuity of operations.	~~1. My organization's processes and procedures for sharing knowledge are well documented and easy to find.~~ 2. The processes for how to share information with others in my organization are updated on a regular basis. 3. Policies and procedures are updated to remove obstacles. 4. Leaders in my organization advocate the use of processes that promote knowledge exchange.
	A2: Connects communities of interest to promote knowledge exchange and integration.	1. My organization has procedures in place to connect personnel with similar interests. 2. My organization encourages members to participate in learning communities. 3. Leaders in my organization encourage personnel to participate in activities that promote knowledge exchange. 4. My organization's decisions are routinely guided by information acquired from both within and outside the organization.
	A3: Leverages systems to share knowledge that aligns with work requirements.	1. Personnel use technology to share knowledge that enhances performance. 2. My organization consistently uses information systems to share pertinent knowledge. 3. Systems to support organizational learning are regularly updated. 4. My organization implements new systems to enhance learning and operational performance.
	A4: Captures and disseminates lessons learned.	1. In my organization, it is easy to find 'lessons learned' that can be applied to current problems I am facing. 2. Members of my organization know exactly where to go and how to find information and best practices to support their job performance. 3. If someone identifies a better way of doing something in one part of the organization, it is quickly disseminated throughout the organization. 4. Members of my organization readily share best practices for optimizing work processes across the organization.

Note: strikethrough text indicates the three removed items following initial validation efforts. Thus, the original ALOA included all 72 items, while the final ALOA includes the 69 items without strikethrough text. **D** = Dimension, **A** = Attribute.

Appendix C: LOMR Macros

```
Public Sub Report()  
'Macro to create word docs  
  
Dim objWord As Object  
Dim objDoc As Object  
Dim oleObj As Object  
Dim cell As Range  
Dim ws As Worksheet  
Dim ins As Worksheet  
Dim Filename As String  
  
Set ins = ThisWorkbook.Worksheets("Instructions")  
Set ws = ThisWorkbook.Worksheets("Data_Results")  
  
Set oleObj = ins.OLEObjects(1)  
oleObj.Activate  
Set objWord = oleObj.Object.Application  
objWord.Visible = False  
Set objDoc = oleObj.Object  
  
Filename = ThisWorkbook.Path & "\ " & ws.Cells(8, 1).Text & " " & "Report_" & Format(Now, "dd mmm yyyy")  
& ".docx"  
oleObj.Object.SaveAs2 Filename:=Filename  
oleObj.Object.Close  
  
'Set Word Objects  
Set objWord = GetObject(, "Word.Application")  
objWord.Visible = False  
Set objDoc = objWord.documents.Open(Filename)  
'Add Text to Template  
objDoc.Bookmarks("D1A1_Level").Range.Text = ws.Cells(3, 2).Text  
objDoc.Bookmarks("D1A2_Level").Range.Text = ws.Cells(3, 3).Text  
objDoc.Bookmarks("D1A3_Level").Range.Text = ws.Cells(3, 4).Text  
objDoc.Bookmarks("D1A4_Level").Range.Text = ws.Cells(3, 5).Text  
objDoc.Bookmarks("D2A1_Level").Range.Text = ws.Cells(3, 6).Text  
objDoc.Bookmarks("D2A2_Level").Range.Text = ws.Cells(3, 7).Text  
objDoc.Bookmarks("D2A3_Level").Range.Text = ws.Cells(3, 8).Text  
objDoc.Bookmarks("D3A1_Level").Range.Text = ws.Cells(3, 9).Text  
objDoc.Bookmarks("D3A2_Level").Range.Text = ws.Cells(3, 10).Text  
objDoc.Bookmarks("D3A3_Level").Range.Text = ws.Cells(3, 11).Text  
objDoc.Bookmarks("D3A4_Level").Range.Text = ws.Cells(3, 12).Text  
objDoc.Bookmarks("D4A1_Level").Range.Text = ws.Cells(3, 13).Text  
objDoc.Bookmarks("D4A2_Level").Range.Text = ws.Cells(3, 14).Text  
objDoc.Bookmarks("D4A3_Level").Range.Text = ws.Cells(3, 15).Text  
objDoc.Bookmarks("D5A1_Level").Range.Text = ws.Cells(3, 16).Text  
objDoc.Bookmarks("D5A2_Level").Range.Text = ws.Cells(3, 17).Text  
objDoc.Bookmarks("D5A3_Level").Range.Text = ws.Cells(3, 18).Text  
objDoc.Bookmarks("D5A4_Level").Range.Text = ws.Cells(3, 19).Text  
objDoc.Bookmarks("Q1_Unfav").Range.Text = ws.Cells(4, 20).Text  
objDoc.Bookmarks("Q2_Unfav").Range.Text = ws.Cells(4, 21).Text  
objDoc.Bookmarks("Q3_Unfav").Range.Text = ws.Cells(4, 22).Text  
objDoc.Bookmarks("Q4_Unfav").Range.Text = ws.Cells(4, 23).Text  
objDoc.Bookmarks("Q5_Unfav").Range.Text = ws.Cells(4, 24).Text  
objDoc.Bookmarks("Q6_Unfav").Range.Text = ws.Cells(4, 25).Text
```

[illegible]

[illegible]

[illegible]


```

objDoc.Bookmarks("D3A3_Description").Range.Text = ws.Cells(7, 11).Text
objDoc.Bookmarks("D3A4_Description").Range.Text = ws.Cells(7, 12).Text
objDoc.Bookmarks("D4A1_Description").Range.Text = ws.Cells(7, 13).Text
objDoc.Bookmarks("D4A2_Description").Range.Text = ws.Cells(7, 14).Text
objDoc.Bookmarks("D4A3_Description").Range.Text = ws.Cells(7, 15).Text
objDoc.Bookmarks("D5A1_Description").Range.Text = ws.Cells(7, 16).Text
objDoc.Bookmarks("D5A2_Description").Range.Text = ws.Cells(7, 17).Text
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```

'Save

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    _
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objWord.Quit SaveChanges:=False
End Sub

```

Appendix D: Army Learning Organization Maturity Report Example

ARMY LEARNING ORGANIZATION ASSESSMENT Confidential Learning Organization Maturity Report Submitted To: Captain Alpha 	SAMPLE
FOR OFFICIAL USE ONLY – Information contained in this report is confidential. This report should only be used for the personal development and insight of the individual named above, the report owner, who possesses the responsibility to safeguard the report and its contents. The decision to share the individual-specific information contained in this report with others is solely the responsibility of the report owner. Unauthorized disclosure of this information may result in civil and criminal penalties. If you are not the intended recipient, or believe you have received this report in error, do not copy, disseminate, or otherwise use this information. Contact the report owner or preparer regarding the document ("DoD Directive 5200.01, DoD Information Security Program: Controlled Unclassified Information," 24 FEB 2014).	

OVERVIEW

Current discussions in the Army have emphasized the importance of leaders' ability to learn and adapt to ensure their success in complex and ever-changing tactical, operational and strategic environments. At the heart of these discussions lies the implicit notion that the old ways of doing things, while effective in the past, may be inadequate for future success and deriving new approaches to meet the Army's objectives will require learning. Army organizations must modify their overall approach to learning to maximize the potential of their personnel and make the most effective use of resources. Change in the way we train and educate our Soldiers, as stated in the Army Vision, is critical to remain the most technically proficient, best-educated, and best-trained ground force in the world.

The capacity of Army organizations and individuals to learn, adapt, and grow through education, training, and experience has significant operational implications. Realizing the Army's potential for future success, the Research Institute (ARI) has developed an Army Learning Organization Maturity Model (ALOMM) to characterize Army Learning Organizations (LO) - organizations with a positive learning culture that promote high quality individual and organizational learning in support of continuous improvement, organizational agility and ensure the future success of the Army. The primary goal of the ALOA is to enable Army organizations to become more agile and adaptable so that they can meet the challenges of the future effectively and efficiently, spending fewer resources to achieve better outcomes for the Army.

To help Army organizations mature into Learning Organizations, ARI has created an end-to-end Army Learning Organization Assessment (ALOA). The ALOA is designed to measure indicators of Army learning organization maturity. By regularly assessing the ALOA, results of the ALOA have the potential to enhance Army learning outcomes and the adaptability of the Army (and its people) to adapt to regularly changing demands. The ALOA consists of five dimensions and 18 underlying attributes in the ALOMM model to provide a comprehensive assessment of learning maturity in the Army.

Members of your organization will receive the ALOA and the results of that assessment are provided in this Army Learning Organization Maturity Report.

ARMY LEARNING ORGANIZATION MATURITY MODEL (ALOMM)

A Learning Organization refers to an organization that continuously orients itself towards the processes or activities undertaken by an organization to collectively acquire skills and knowledge. A Learning Organization focuses on the capability of an organization to integrate continuous learning activities and to adapt in response to learning outcomes. The Army's Learning Organization Maturity Model (ALOMM) is an institutional level model that identifies what is required for the Army to be a learning organization and demonstrate learning outcomes at each echelon of the organization.

The ALOMM is presented in the table below and consists of dimensions and attributes. The dimensions represent the key functions that a true learning organization conducts. The attributes are a subset of each dimension. For a given dimension, the attributes reflect the core behaviors that would be observable in the demonstration of that dimension.

Dimension 1: Cultivation of Learning Support	
Definition	Maintaining a culture that is conducive to continuous learning for individuals and the organization by providing resources, removing obstacles and incentivizing and modeling behaviors that support learning.
Attribute 1	Communicates the value of learning, new ideas and open dialogue across all levels.
Attribute 2	Recognizes and rewards initiatives to generate and share new knowledge.
Attribute 3	Encourages learning that promotes continuous self- and organizational- improvement.
Attribute 4	Provides resources and opportunities to enable learning and development.
Dimension 2: Orientation toward a Shared Purpose	
Definition	Creating a shared organizational vision and a common understanding of the vision used to collectively achieve the vision.
Attribute 1	Collaborates to define strategies for learning to achieve shared purpose.
Attribute 2	Demonstrates a unified purpose for how learning is used to achieve a shared organizational vision.
Attribute 3	Works together to integrate learning into daily operations.
Dimension 3: Exploration and Innovation	
Definition	Searching continuously for new perspectives and ideas that challenge current thinking to give rise to improvements.
Attribute 1	Conducts ongoing assessment of the current state of learning and identifies where learning is needed.
Attribute 2	Challenges current practices and generates new ideas that align with learning objectives.
Attribute 3	Applies new ideas that lead to improvements in learning.
Attribute 4	Builds a foundation of trust to enable the implementation of new knowledge.
Dimension 4: Integration of Capabilities	
Definition	Aligning capabilities and resources to address interdependencies that promote learning and enhance effectiveness.
Attribute 1	Integrates capabilities and resources to achieve a common goal.
Attribute 2	Leverages diverse capabilities and resources to create value for the organization.
Attribute 3	Considers environmental and organizational elements when identifying courses of action.
Dimension 5: Management of Organizational Knowledge	
Definition	Engaging the organization to identify, capture, store, transfer and apply knowledge and organizational values to optimize performance.
Attribute 1	Maintains processes for knowledge exchange and continuity of operations.
Attribute 2	Connects communities of interest to promote knowledge exchange and integration.
Attribute 3	Leverages systems to share knowledge that aligns with work requirements.
Attribute 4	Captures and disseminates lessons learned.

Appendix E: Project Summary

Project Summary ALOA Validation

(1) **Purpose of the research:** *You are being invited to take part in research that is being conducted by the U.S. Army Research Institute (ARI) for the Behavioral and Social Sciences, Fort Leavenworth, KS. The purpose of this research is to validate an Army Learning Organization Assessment developed from a model that characterizes what Army organizations should look like as they advance toward becoming learning organizations.*

(2) **What you will be asked to do in this research:** *You will be asked to provide responses to a series of questions about learning organization characteristics and behavioral indicators you have observed in your unit/organization as well as feedback on this assessment. This assessment of learning organization maturity will gather metrics on the components of the Army Learning Organization Maturity Model and will aggregately inform your leadership of areas of strength in the unit and areas in need of improvement. With appropriate review, the data/information collected here may be used in future research projects.*

(3) **Voluntary participation:** *Your participation is voluntary. You may choose not to participate at any time and there is no penalty or loss of benefits to which you are otherwise entitled if you do not participate or withdraw from participation. You may choose not to provide responses to any or all questions, and you have the right to withdraw from this project at any time and without explanation.*

(4) **Confidentiality:** *All participants' responses to this assessment will be combined, aggregated, and provided to your command. We will not attribute specific responses to you or any other particular participant within this exercise. It may be possible to combine different responses to the demographic questions to identify an individual. However, all responses will be kept confidential. We will not identify you in any report or document, nor attribute specific responses to you or any other particular participant. All data analyses will be conducted only by persons engaged in and for the purpose of this research. We will NOT include your name, or other personally identifiable information in any report or documents provided outside of the context of this exercise. All data will be stored in an encrypted database on secure Army computers. Only project personnel who have been officially documented and approved will have access to the data. We cannot provide "confidentiality" or "non-attribution," to a participant regarding comments involving criminal activity/behavior, or statements that pose a threat to yourself or others.*

(5) **Time required.** *Up to twenty (20) minutes.*

(6) **Risks.** *Although we have approved safeguards to secure these data, there is always some risk that data will be disclosed. Otherwise, we do not anticipate that your participation has any greater risk than would be encountered in everyday life and normal activities.*

(7) **Benefits.** *There is no direct benefit to you associated with your participation. However, your responses will be used to validate the Army Learning Organization Assessment which can benefit Army organizations that choose to use this assessment for developing their organizations as Army Learning Organizations.*

(8) **Compensation.** *None.*

(9) **Whom to contact if you have questions about the research project.** *You should send your questions to usarmy.belvoir.hqda-ari.mesg.surveys@mail.mil. Reference project name: ALOA Validation.*

(10) **Whom to contact about your rights in the research or if you incur a research related injury.** usarmy.belvoir.hqda-ari.mesg.surveys@mail.mil with the “ALOA Validation” in the Subject line.

(11) *If responding to any of the questions becomes unpleasant for you, you can withdraw from the survey at any time. If you feel you would like to confer with someone confidentially after this survey, please go to the Military OneSource web site (<https://www.militaryonesource.mil>) or call 1-800-342-9647.*

(12) *Please print this page if you would like a copy for your personal records.*

Appendix F: Demographics

Demographics

1. What is your current rank?

- ☐ Private (PVT)
- ☐ Private Second Class (PV2)
- ☐ Private First Class (PFC)
- ☐ Specialist (SPC)
- ☐ Corporal (CPL)
- ☐ Sergeant (SGT)
- ☐ Staff Sergeant (SSG)
- ☐ Sergeant First Class (SFC)
- ☐ Master Sergeant (MSG)
- ☐ First Sergeant (1SG)
- ☐ Sergeant Major (SGM)
- ☐ Command Sergeant Major (CSM)
- ☐ Warrant Officer 1 (WO1)
- ☐ Chief Warrant Officer 2 (CWO2)
- ☐ Chief Warrant Officer 3 (CWO3)
- ☐ Chief Warrant Officer 4 (CWO4)
- ☐ Chief Warrant Officer 5 (CWO5)
- ☐ Second Lieutenant (2LT)
- ☐ First Lieutenant (1LT)
- ☐ Captain (CPT)
- ☐ Major (MAJ)
- ☐ Lieutenant Colonel (LTC)
- ☐ Colonel (COL)
- ☐ Brigadier General (BG)
- ☐ Major General (MG)
- ☐ Lieutenant General (LTG)
- ☐ General (GEN)

2. Which Battalion do you belong to?

- ☐ [options specific to this sample]

3. Which Company/Troop/Battery/Staff section do you belong to?

- ☐ [options specific to this sample]

4. How long have you been a member of your current *company*? Enter a whole number in *months*.

5. Are you currently a company commander within the 1st Signal Brigade?

- ☐ Yes
- ☐ No

This Question is Conditionally Shown if: (5 = No)

5a. Do you have prior command experience?

- ☐ Yes
- ☐ No

This Question is Conditionally Shown if: (5a = Yes)

5b. My highest level of command experience is at the:

- ☐ Battalion level
- ☐ Company level
- ☐ Other _____

This Question is Conditionally Hidden if: (5 = Yes)

6. Which Platoon do you belong to?

- ☐ [options specific to this sample]

Appendix G: ALOA Feedback Survey

Introduction:

You just completed the Army Learning Organization Assessment (ALOA) that asked you to indicate how frequently various learning organization behaviors are demonstrated in your organization. This next section includes a short survey to gather your thoughts on the ALOA.

A few things to keep in mind:

- Your responses are anonymous and will not be linked to you as an individual. Only aggregated results will be reported.
- The results are NOT being used to evaluate or otherwise compare organizations.
- Your input will be used to inform improvements to the ALOA. Honesty is paramount. Areas of improvement cannot be improved if they are not identified.

(End of Page)

Instructions: Review the 9 statements below and indicate your level of agreement with those statements using the 5-point scale provided. If prompted, please also provide written feedback in response to the probed that follow each statement.

1. The ALOA instructions are clear enough that I understand what is expected of me in responding to the ALOA.

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Neither Disagree nor Agree
- ☐ Agree
- ☐ Strongly Agree

This Question is Conditionally Shown if: (1 = Strongly Disagree OR 1 = Disagree OR 1 = Neither Disagree nor Agree)

1b. Please share any suggestions you have for improving the instructions so participants clearly understand what is expected.

2. The ALOA items are clear enough that I understand what they are asking.

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Neither Disagree nor Agree
- ☐ Agree
- ☐ Strongly Agree

This Question is Conditionally Shown if: (2 = Strongly Disagree OR 2 = Disagree OR 2 = Neither Disagree nor Agree)

2a. Please provide any suggestions you have for how to improve specific ALOA items that make them easier to understand.

3. The ALOA items address behaviors that can be easily observed (as opposed to inferred) in my organization.

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Neither Disagree nor Agree
- ☐ Agree
- ☐ Strongly Agree

This Question is Conditionally Shown if: (3 = Strongly Disagree OR 3 = Disagree OR 3 = Neither Disagree nor Agree)

3a. Please provide any suggestions for how to improve these ALOA items in a way that better addresses observable behaviors in your organization.

4. The ALOA items address behaviors that are relevant to my job in the Army.

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Neither Disagree nor Agree
- ☐ Agree
- ☐ Strongly Agree

This Question is Conditionally Shown if: (4 = Strongly Disagree OR 4 = Disagree OR 4 = Neither Disagree nor Agree)

4a. Please provide suggestions for how to improve these ALOA items in a way that better addresses behaviors that are relevant to your job in the Army.

5. Demonstrating the behaviors captured in the ALOA is critical to the future success of my organization.

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Neither Disagree nor Agree
- ☐ Agree
- ☐ Strongly Agree

This Question is Conditionally Shown if: (5 = Strongly Disagree OR 5 = Disagree OR 5 = Neither Disagree nor Agree)

5a. Please provide suggestions for how to improve the ALOA in a way that will better capture behaviors that are critical to the future success of your organization.

6. Please briefly describe any challenges you had in responding to the ALOA.

Instructions: For the questions below, please select a Yes or No response. If prompted, please also provide written feedback in response to the probes that follow each question.

7. Did you encounter any ALOA items that you feel were offensive or confusing and thus should be eliminated from the ALOA?

- ☐ Yes _____
☐ No _____

8. In considering what you would expect defines an Army Learning Organization, are there any items you would suggest adding to the ALOA?

- ☐ Yes _____
☐ No _____

9. Please provide any additional feedback you have that was not covered in the questions above (leave blank if N/A).

(End of Page 9)

Appendix H: Australian Army Learning Organization Questionnaire (ALOQ; Stothard, 2014)

ALOQ Construct	ALOQ Item
Create continuous learning opportunities	We openly discuss mistakes in order to learn from them We Identify skills we need for future work tasks We help each other learn We can get money and other resources to support our learning We are given time to learn We view problems in our work as an opportunity to learn We are rewarded for learning
Promote inquiry and dialogue	We give open and honest feedback to each other We listen to others' views before speaking We are encouraged to ask 'why' regardless of rank Whenever we state our views, we also ask what others think We treat each other with respect We spend our time building trust with each other
Encourage collaboration and team learning	Workgroups/Sections have the freedom to change their goals as needed Workgroups/Sections treat members as equals regardless of rank, culture or any other differences Workgroups/Sections focus both on the group's task and on how well the group is working Workgroups/Sections change their thinking as a result of group discussions Workgroups/Sections are rewarded for their achievements as a team or group Workgroups/Sections are confident that Army will act on their suggestions
Establish systems to capture and share learning	Army uses two-way communications regularly (e.g., suggestion systems, open meetings) Army lets us get the information required to do our jobs quickly and easily Army maintains an up-to-date profile of our qualifications Army measures gaps between current and expected performance Army makes lessons learnt available to all its people Army seeks feedback from its people on the effectiveness of training courses
Empower people to a collective vision	Army recognizes its people for taking initiative Army gives its people choices in their work assignments Army asks its people to contribute to its vision Army gives its people control over the resources they need to accomplish their work Army supports people with innovative work practices Army allows all ranks and groups to have a say in Army's vision
Connect the organization to its environment	Army helps its people to balance work and family life Army encourages its people to think about the global perspective Army encourages its people to think about Army's image when making decisions Army considers the impact of decisions on morale Army works with communities to meet both Army's and communities' needs Army encourages its people to seek advice from different parts of Army when solving problems Army allows its people to informally discuss problems and seek advice outside their unit*
Provide strategic leadership for learning	Supervisors generally support requests for learning opportunities and training Supervisors share information quickly and easily Supervisors empower their subordinates to help carry out Army's vision Supervisors mentor and coach those they lead Supervisors continually look for opportunities to learn Supervisors ensure that all actions are consistent with Army's values

Leadership commitment and empowerment	Senior leaders resist change and are afraid of new ideas
	Senior leaders share a common vision with each other of what our work should accomplish
	We are given opportunities to provide feedback to our superiors
	Supervisors often provide useful feedback that helps to identify potential problems and opportunities
Experimentation and rewards	Supervisors frequently involve subordinates in important decisions
	Supervisors encourage team members to experiment in order to improve work processes
	Innovative ideas are often rewarded by supervisors
	New ideas from subordinates are not treated seriously by supervisors
Transfer of knowledge	I often bring new ideas to my Workgroup/Section
	People who are new are encouraged to question the way things are done
	I often have an opportunity to talk to others about why tasks either succeeded or failed
	Failures are discussed constructively
Teamwork and group problem solving	New work processes that may be useful across Army are shared with all appropriate workers
	We have a system that allows us to learn successful practices from other organizations
	We often approach our supervisors for guidance with a problem
	We can usually form informal groups to solve problems
	Most problem solving features people from a variety of groups

Note: Bold items were administered as part of the ALOA validation. *indicates reverse-scored items.

Appendix I: ALOA Reliability for Initial and Modified ALOA

Construct	Cronbach's α
D1A1	.91
D1A2	.92
D1A3	.90
D1A4	.89
D2A1	.90 (.89)
D2A2	.90
D2A3	.89
D3A1	.90 (.86)
D3A2	.88
D3A3	.91
D3A4	.87
D4A1	.86
D4A2	.90
D4A3	.88
D5A1	.90 (.87)
D5A2	.90
D5A3	.86
D5A4	.91
D1	.97
D2	.96 (.95)
D3	.97 (.96)
D4	.95
D5	.97 (.96)

Note. **D** in the construct label represents dimension and **A** represents attribute. Numbers in parentheses represent alphas in the final 69-item assessment.

Appendix J: Initial Factor Loadings from Items to Attributes, Attributes to Dimension

Initial Factor Loadings from Items to Attributes, Attributes to Dimension

Dimension	Attribute	Factor Loading	Item	Factor Loading
D1	A1	0.93	1	0.86
			2	0.90
			3	0.88
			4	0.78
	A2	0.93	1	0.90
			2	0.89
			3	0.79
			4	0.87
	A3	0.94	1	0.74
			2	0.84
			3	0.88
			4	0.87
	A4	0.94	1	0.83
			2	0.88
			3	0.77
			4	0.82
D2	A1	.96	1	0.83
			2	0.85
			3	0.78
			4	0.83
	A2	.94	1	0.83
			2	0.83
			3	0.87
			4	0.81
	A3	.97	1	0.77
			2	0.82
			3	0.85
			4	0.86
D3	A1	.97	1	0.82
			2	0.87
			3	0.83
			4	0.83
	A2	.96	1	0.76
			2	0.80
			3	0.83
			4	0.83

Initial Factor Loadings from Items to Attributes, Attributes to Dimension (continued)

Dimension	Attribute	Factor Loading	Item	Factor Loading
	A3	.95	1	0.81
			2	0.82
			3	0.87
			4	0.87
	A4	.93	1	0.77
			2	0.82
			3	0.76
			4	0.80
D4	A1	.94	1	0.76
			2	0.73
			3	0.77
			4	0.83
	A2	.98	1	0.85
			2	0.83
			3	0.83
			4	0.83
	A3	.95	1	0.84
			2	0.80
			3	0.78
			4	0.78
D5	A1	.97	1	0.82
			2	0.83
			3	0.79
			4	0.85
	A2	.95	1	0.80
			2	0.86
			3	0.86
			4	0.83
	A3	.98	1	0.66
			2	0.75
			3	0.83
			4	0.83
	A4	.95	1	0.84
			2	0.86
			3	0.84
			4	0.84

Appendix K: Exploratory Factor Analysis of Dimensions 2 and 3

Promax Rotation EFA

	Factor1	Factor2
D2A1Q1	<u>0.436</u>	0.402
D2A1Q2	0.387	0.467
D2A1Q3	0.309	0.477
D2A1Q4	0.277	0.558
D2A2Q1	-0.040	0.848
D2A2Q2	0.108	0.710
D2A2Q3	0.100	0.748
D2A2Q4	-0.092	0.884
D2A3Q1	0.222	0.560
D2A3Q2	0.277	0.570
D2A3Q3	0.143	0.717
D2A3Q4	0.122	0.752
D3A1Q1	0.249	0.604
D3A1Q2	0.177	<u>0.730</u>
D3A1Q3	0.643	0.193
D3A1Q4	0.563	0.274
D3A2Q1	0.613	0.177
D3A2Q2	0.881	-0.068
D3A2Q3	0.804	0.017
D3A2Q4	0.814	0.030
D3A3Q1	0.736	0.070
D3A3Q2	0.559	0.288
D3A3Q3	0.719	0.153
D3A3Q4	0.674	0.196
D3A4Q1	0.743	0.014
D3A4Q2	0.794	-0.016
D3A4Q3	0.490	0.246
D3A4Q4	0.527	0.270

Note. Items bolded represent items that are loading onto the opposing factor. Items underlined represent items that were dropped from analyses.

Appendix L: Exploratory Factor Analysis of Dimensions 4 and 5

Promax Rotation EFA

	Factor1	Factor2
D4A1Q1	0.278	0.462
D4A1Q2	0.217	0.487
D4A1Q3	0.098	0.633
D4A1Q4	0.092	0.734
D4A2Q1	-0.031	0.882
D4A2Q2	0.029	0.791
D4A2Q3	-0.013	0.833
D4A2Q4	0.294	0.565
D4A3Q1	0.149	0.700
D4A3Q2	0.183	0.629
D4A3Q3	0.186	0.549
D4A3Q4	0.166	0.589
D5A1Q1	0.346	<u>0.481</u>
D5A1Q2	0.372	0.476
D5A1Q3	0.315	0.480
D5A1Q4	0.621	0.249
D5A2Q1	0.665	0.155
D5A2Q2	0.863	-0.024
D5A2Q3	0.762	0.086
D5A2Q4	0.717	0.102
D5A3Q1	0.587	0.076
D5A3Q2	0.734	0.011
D5A3Q3	0.661	0.185
D5A3Q4	0.465	0.386
D5A4Q1	0.653	0.184
D5A4Q2	0.758	0.084
D5A4Q3	0.692	0.129
D5A4Q4	0.679	0.157

Note. Items bolded represent items that are loading onto the opposing factor. Items underlined represent items that were dropped from analyses.

Appendix M: Factor Loadings for the Final ALOA

Factor Loadings for the Final ALOA

Dimension	Attribute	Factor Loading	Item	Factor Loading
D1	A1	0.93	1	0.86
			2	0.90
			3	0.88
			4	0.78
	A2	0.93	1	0.90
			2	0.89
			3	0.79
			4	0.87
	A3	0.94	1	0.74
			2	0.84
			3	0.88
			4	0.87
	A4	0.94	1	0.83
			2	0.88
			3	0.77
			4	0.82
D2	A1	0.96	Removed	
			2	0.85
			3	0.79 (+0.01)
			4	0.84 (+0.01)
	A2	0.94	1	0.83
			2	0.83
			3	0.87
			4	0.81
	A3	0.97	1	0.77
			2	0.82
			3	0.85
			4	0.86

Factor Loadings for the Final ALOA (continued)

Dimension	Attribute	Factor Loading	Item	Factor Loading
D3	A1	0.97	1	0.80 (-0.02)
			Removed	
			3	0.84 (+0.01)
			4	0.83
	A2	0.97 (+0.01)	1	0.76
			2	0.80
			3	0.83
			4	0.83
	A3	0.96 (+0.01)	1	0.81
			2	0.82
			3	0.87
			4	0.87
	A4	0.93	1	0.77
			2	0.82
			3	0.76
			4	0.80
D4	A1	0.94 (+0.01)	1	0.76
			2	0.74 (+0.01)
			3	0.77
			4	0.83
	A2	0.98	1	0.85
			2	0.83
			3	0.83
			4	0.83
	A3	0.95	1	0.84
			2	0.80
			3	0.78
			4	0.78

Factor Loadings for the Final ALOA (continued)

Dimension	Attribute	Factor Loading	Item	Factor Loading
D5	A1	0.98 (+0.01)	Removed	
			2	0.82 (-0.01)
			3	0.78 (-0.01)
			4	0.86 (-0.01)
	A2	0.95	1	0.80
			2	0.86
			3	0.86
			4	0.83
	A3	0.98	1	0.67 (+0.01)
			2	0.76 (+0.01)
			3	0.83
			4	0.83
	A4	0.95	1	0.84
			2	0.86
			3	0.84
			4	0.84

Note. Numbers in parentheses indicate an increase (+) or decrease (-) in the factor loading from the initial factor analysis. Some differences may be due to software rounding.