NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

JOINT APPLIED PROJECT

ARMY CONTRACTING WORKFORCE DEVELOPMENT BUILDING CORE COMPETENCIES AND SKILLS

By: Christina L. Lene and
Dawn M. Poppler
September 2014

Advisors: Rene G. Rendon,
Wiley R. Cox

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.			
1. AGENCY USE ONLY ***(Leave blank)***	**2. REPORT DATE** September 2014	**3. REPORT TYPE AND DATES COVERED** Joint Applied Project	
4. TITLE AND SUBTITLE ARMY CONTRACTING WORKFORCE DEVELOPMENT BUILDING CORE COMPETENCIES AND SKILLS			**5. FUNDING NUMBERS**
6. AUTHOR(S) Christina L. Lene and Dawn M. Poppler			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			**8. PERFORMING ORGANIZATION REPORT NUMBER**
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			**10. SPONSORING/MONITORING AGENCY REPORT NUMBER**
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB protocol number NPS.2011.0084-IR-EP7-A.			
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			**12b. DISTRIBUTION CODE** A

13. ABSTRACT (maximum 200 words)

Operational contracting support provided by the Army Mission and Installation Contracting Command to the warfighter includes everything from acquiring the necessary equipment, supplies, and services vital to the mission to the overall well-being of the Army Soldiers and their families. The Army faces issues and challenges throughout the acquisition process, particularly in the contracting career field. Assessing any contracting knowledge gap can be a challenge because of the sheer magnitude of the required knowledge involved in Department of Defense contract management. To capture the data needed to measure and analyze tacit knowledge and explicit knowledge, a knowledge assessment tool was used. Following the distribution of the assessment tool, an analysis of the knowledge gap was performed on multiple demographic categories.

This information enables organizations to develop an on the job training task management guide that will not only train contracting personnel in all of the contracting phases but also focus in on the knowledge gaps identified within the research. Furthermore, there will be an increased visibility for supervisors and contracting officers to provide the feedback necessary through supplemental training to ensure the readiness of the contracting specialists within the 1102 career field.

14. SUBJECT TERMS contracting, knowledge assessment, explicit knowledge, tacit knowledge, operational contracting			**15. NUMBER OF PAGES** 131
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	**18. SECURITY CLASSIFICATION OF THIS PAGE** Unclassified	**19. SECURITY CLASSIFICATION OF ABSTRACT** Unclassified	**20. LIMITATION OF ABSTRACT** UU

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

ARMY CONTRACTING WORKFORCE DEVELOPMENT BUILDING CORE COMPETENCIES AND SKILLS

Christina L. Lene, Civilian, United States Army
Dawn M. Poppler, Civilian, United States Army

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN PROGRAM MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
September 2014

Authors: Christina L. Lene

Dawn M. Poppler

Approved by: Rene G. Rendon

Wiley R. Cox, Mission and Installation Contracting Command

William R. Gates, Dean
Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

ARMY CONTRACTING WORKFORCE DEVELOPMENT BUILDING CORE COMPETENCIES AND SKILLS

ABSTRACT

Operational contracting support provided by the Army Mission and Installation Contracting Command to the warfighter includes everything from acquiring the necessary equipment, supplies, and services vital to the mission to the overall well-being of the Army Soldiers and their families. The Army faces issues and challenges throughout the acquisition process, particularly in the contracting career field. Assessing any contracting knowledge gap can be a challenge because of the sheer magnitude of the required knowledge involved in Department of Defense contract management. To capture the data needed to measure and analyze tacit knowledge and explicit knowledge, a knowledge assessment tool was used. Following the distribution of the assessment tool, an analysis of the knowledge gap was performed on multiple demographic categories.

This information enables organizations to develop an on the job training task management guide that will not only train contracting personnel in all of the contracting phases but also focus in on the knowledge gaps identified within the research. Furthermore, there will be an increased visibility for supervisors and contracting officers to provide the feedback necessary through supplemental training to ensure the readiness of the contracting specialists within the 1102 career field.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I. INTRODUCTION....1
- A. BACKGROUND....1
- B. PROBLEM STATEMENT....2
- C. RESEARCH OBJECTIVES....3
- D. RESEARCH QUESTIONS....3
- E. BENEFITS OF RESEARCH....3
- F. LIMITATIONS OF RESEARCH....4
- G. METHODOLOGY....5
- H. ORGANIZATION OF REPORT....5
- I. SUMMARY....6

II. LITERATURE REVIEW....7
- A. INTRODUCTION....7
- B. KNOWLEDGE MANAGEMENT....7
  - 1. Types of Knowledge....8
  - 2. Department of Defense Contracting Competency Model....9
  - 3. Contract Management Maturity Model....11
- C. EDUCATION AND TRAINING IN CONTRACTING....12
  - 1. Defense Acquisition Workforce Improvement Act....12
  - 2. Defense Acquisition University....13
  - 3. Human Capital Strategic Plan....15
- D. THE CURRENT CONTRACTING WORKFORCE ENVIRONMENT....16
- E. TACIT AND EXPLICIT KNOWLEDGE IN THE ARMY....18
- F. SUMMARY....19

III. ARMY CONTRACTING COMMAND....21
- A. INTRODUCTION....21
- B. ARMY MATERIEL COMMAND....21
- C. ARMY CONTRACTING COMMAND....22
- D. EXPEDITIONARY CONTRACTING COMMAND....23
- E. MISSION INSTALLATION CONTRACTING COMMAND....23
- F. SUMMARY....25

IV. FINDINGS AND ANALYSIS....27
- A. ASSESSMENT CONSTRUCTION....27
- B. ASSESSMENT VALIDITY....28
- C. ASSESSMENT CONTENTS....28
  - 1. Demographic Questions....29
  - 2. Tacit Knowledge Questions....29
  - 3. Explicit Knowledge Questions....31
- D. ASSESSMENT POPULATION....32
- E. LIMITATIONS OF ASSESSMENT TOOL....32

F. ASSESSMENT RESPONSE **33**
G. FINDINGS **34**
1. Results by Career Series **34**
a. Military ***35***
b. Civilian ***36***
c. Unknown ***37***
2. Results by DAWIA Certification Level **37**
a. Non-DAWIA Level Certified ***38***
b. DAWIA Level I Certified ***39***
c. DAWIA Level II Certified ***40***
d. DAWIA Level III Certified ***41***
3. Results by Years of Experience **42**
a. Respondents with 0–2 Years of Experience ***43***
b. Respondents with 2–4 Years of Experience ***44***
c. Respondents with 4–6 Years of Experience ***45***
d. Respondents with Six or More Years of Experience ***46***
4. Results by Warrant Level **47**
a. Respondents with No Warrant ***48***
b. Respondents with a Limited Warrant (Less than $1 million) ***49***
c. Respondents with a Limited Warrant ($1 Million–$10 Million) ***50***
d. Respondents with a Limited Warrant ($10 Million, But Less Than Unlimited) ***51***
e. Respondents with an Unlimited Warrant ***52***
5. Results by Preferred Training Method **53**
a. Respondents Preferring DAU Training ***54***
b. Respondents Preferring FAR Training ***54***
c. Respondents Preferring On-The-Job Training ***55***
6. Results by Training Frequency **56**
a. Respondents by Weekly Training Frequency ***57***
b. Respondents by Twice a Month Training Frequency ***58***
c. Respondents by Monthly Training Frequency ***59***
d. Respondents by Quarterly Training Frequency ***60***
7. Overall Career Field Knowledge **61**
H. ANALYSIS **62**
1. Knowledge Analysis by Career Series **63**
2. Knowledge Analysis by DAWIA Certification **66**
3. Knowledge Analysis by Years of Experience **69**
4. Knowledge Analysis by Warrant Level **73**
5. Knowledge Analysis by Preferred Training Method **77**
6. Knowledge Analysis by Preferred Training Frequency **81**
7. Knowledge Analysis for the Overall Career Field **84**
I. SUMMARY OF FINDINGS **86**

1. Career Series 86
2. DAWIA Certification Level 86
3. Years of Experience 87
4. Warrant Level 87
5. Preferred Training Method 87
6. Training Frequency 88
7. Overall Contracting Career Field 88
J. RECOMMENDATIONS....88
1. Implement Mandatory Contract Administration Courses in DAWIA Certification....89
2. Develop On-the-Job Training Program....89
3. Incorporate More Contract Administration Procedures in Regulatory Guidance 90
K. SUMMARY 90
V. SUMMARY, CONCLUSION, AND AREAS FOR FURTHER RESEARCH....91
A. SUMMARY 91
B. CONCLUSION 92
1. Where Does the Gap Exist between Explicit and Tacit Contracting Knowledge in the Six Phases of Contracting? 92
2. What Consistencies are there in the Knowledge Gaps across the Various Demographics Surveyed? 93
3. What are the Recommendations to Decrease the Identified Knowledge Gaps?....94
C. AREAS FOR FURTHER RESEARCH....94
APPENDIX A. THE CURRENT COMPETENCY MODEL 97
SUPPLEMENTAL. AFSC 6C0X1 CONTRACTING....105
LIST OF REFERENCES....107
INITIAL DISTRIBUTION LIST 111

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF FIGURES

Figure 1. DAU Learning Hours Delivered (from DAU, 2012) 15
Figure 2. Army Acquisition Career Development Model—Civilian (from USAASC, 2012). 19
Figure 3. Army Material Command Organization (from Vollmecke, 2013). 22
Figure 4. Annex A to O-14-084-01 MICC Organizational Chart—Contracting Support (from Gabbert, 2014) 24
Figure 5. MICC Responses by Career Series 35
Figure 6. MICC Military Assessment Results 36
Figure 7. MICC Civilian Assessment Results 37
Figure 8. Responses by DAWIA Certification Level 38
Figure 9. No DAWIA Level Certified 39
Figure 10. DAWIA Level I Certified 40
Figure 11. DAWIA Level II Certified 41
Figure 12. DAWIA Level III Certified 42
Figure 13. Responses by Years of Experience 43
Figure 14. Respondents with 0–2 Years of Experience 44
Figure 15. Respondents with 2-4 Years of Experience 45
Figure 16. Respondents with 4-6 Years of Experience 46
Figure 17. Respondents with Six or More Years Of Experience 47
Figure 18. Response by Warrant Level 48
Figure 19. Respondents with No Warrant 49
Figure 20. Respondents with a Warrant for Less Than $1M 50
Figure 21. Respondents with a Limited Warrant (Between $1M and $10M) 51
Figure 22. Respondents with an Unlimited Warrant 52
Figure 23. Responses by Preferred Training Method 53
Figure 24. Respondents Preferring DAU Training 54
Figure 25. Respondents Preferring FAR Training 55
Figure 26. Respondents Preferring On-The-Job Training 56
Figure 27. Responses by Training Frequency 57
Figure 28. Respondents by Weekly Training Frequency 58
Figure 29. Respondents by Twice a Month Training Frequency 59
Figure 30. Respondents by Monthly Training Frequency 60
Figure 31. Respondents by Quarterly Training Frequency 61
Figure 32. Overall Contracting Career Field Knowledge 62
Figure 33. Tacit Knowledge by Career Series 63
Figure 34. Explicit Knowledge by Career Series 64
Figure 35. Size of Knowledge Gap by Career Series 65
Figure 36. Tacit Knowledge by DAWIA Certification Level 66
Figure 37. Explicit Knowledge by DAWIA Level 67
Figure 38. Size (%) of Knowledge Gap by DAWIA Certification Level 68
Figure 39. Tacit Knowledge by Years of Experience 70

Figure 40. Explicit Knowledge by Years of Experience 71
Figure 41. Size of Knowledge Gap by Years of Experience 72
Figure 42. Tacit Knowledge by Warrant Level 74
Figure 43. Explicit Knowledge by Warrant Level 75
Figure 44. Size of Knowledge Gap by Warrant 76
Figure 45. Tacit Knowledge by Preferred Training Method 78
Figure 46. Explicit Knowledge by Preferred Training Method 79
Figure 47. Size (%) of Knowledge Gap by Preferred Training Method 80
Figure 48. Tacit Knowledge by Training Frequency 81
Figure 49. Explicit Knowledge by Training Frequency 82
Figure 50. Size (%) of Knowledge Gap by Training Frequency 83
Figure 51. Overall Tacit vs. Explicit Knowledge Levels 85
Figure 52. Overall Tacit vs. Explicit Knowledge Gap 86

LIST OF TABLES

Table 1. List of 12 Problem Areas Identified in DOD IG Reports (from DOD IG, 2009) 17
Table 2. OCKA-AF Question Distribution 32

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

ACC	Army Contracting Command
ACRB	Acquisition Career Record Brief
ACTEDS	Army Civilian Training, Education and Development System
AFARS	Army Federal Acquisition Regulation Supplement
AT&L	Acquisition, Technology, and Logistics
CCBN	contingency contracting battalion
CCM	contracting competency model
CCT	contingency contracting teams
CFCM	certified federal contracts manager
CLP	continuous learning point
CMMM	contracting management maturity model
CONUS	continental United States
CSB	contracting support brigade
DAU	Defense Acquisition University
DAWIA	Defense Acquisition Workforce Improvement Act
DFARS	Defense Federal Acquisition Regulation Supplement
DOD	Department of Defense
DODI	Department of Defense Instruction
ECC	Expeditionary Contracting Command
FAR	Federal Acquisition Regulation
FDO	Field Directorate Office
FY	fiscal year
GAO	Government Accountability Office
HCSP	Human Capital Strategic Plan
IFB	invitation for bid
IG	Inspector General
MICC	Army Mission and Installation Contracting Command
MOS	military occupation specialty

NCMA	National Contract Management Association
OCKA-FA	Air Force Operational Contracting Knowledge Assessment
OCONUS	outside the continental United States
OJT	on the job training
PEO	program executive officer
PGI	procedures, guidance, and information
PLM	performance learning model
RFP	request for proposal
RFQ	request for quote
SCCT	senior contingency contracting teams

ACKNOWLEDGMENTS

We would like to express our appreciation to all that supported us throughout this endeavor. To our advisors, Dr. Rene Rendon and Mr. Wiley Cox, thank you for your constant support, guidance, and direction. Without this, we would have never been able to complete our Naval Postgraduate School Joint Applied Project. To MICC-Fort McCoy, thank you for allowing us the time necessary to pursue our goals at the Naval Postgraduate School. Finally to our families, the love and support you provided throughout this lengthy process has been pivotal to our success. Thank you.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

This chapter discusses the background, problem statement, research objectives, research questions, the benefits of the research, the limitations of research, methodology, and the organization of report.

A. BACKGROUND

Over the years, issues and challenges facing the Department of the Defense (DOD) acquisition process have garnered immense scrutiny from the media and the leadership within the federal government. Some of the challenges facing DOD are minimum manning issues, constant contract deficiencies, and the current budget cuts. In order, to determine the exact extent and the required corrective action to address these challenges, numerous panels, committees, and government organizations have conducted countless studies and investigations. One such committee was the President's Blue Ribbon Commission on Defense Management, otherwise known as the Packard Commission, studied the procurement system submitting a final report to the president entitled *A Quest for Excellence in 1986* (Packard Commission, 1986). The report identified that acquisition personnel particularly contract specialists, were undertrained and undereducated and recommended establishing business-related education and experience criteria for DOD contracting personnel. In addition, the commission recommended centrally managing and funding the training of the acquisition community. In response to the numerous studies and reports including the report by the Packard Commission, the Defense Acquisition Workforce Improvement Act (DAWIA), Public Law 101-510, Title 10 U.S.C., was passed into law in 1990. DAWIA established the Acquisition Corps and established standards for education, training, and work experience. These standards led to the standing up of the Defense Acquisition University (DAU) as a way to develop the acquisition workforce through training. In 2000, the National Defense Authorizations Act for fiscal year 2001 amended DAWIA to require a baccalaureate degree and 24 semester hours in business related courses for the 1102 career field (10 U.S.C. Ch. 87, 2001).

The manner in which DOD manages its contracts has captured the attention of the Government Accountability Office (GAO) so much so that DOD contract management was added to the "High Risk List" maintained by GAO and has remained on the list since 1992. The primary concerns the GAO identified were not using sound business practices, lack of training, and lack of personnel (GAO, 2013).

The DOD Inspector General had written 142 audit reports outlining problematic areas within the DOD acquisition and contract administration process between 2003 and 2008 (Department of Defense Inspector General [DOD IG], 2009). The reports focused on areas in which contracting personnel are responsible, such as adequate support documentation, contract pricing, and the oversight and surveillance of contracts. The overall conclusion made by the DOD IG was that a smaller and less capable workforce was the overarching cause of DOD struggling to follow the statutory and regulatory guidance pertaining to acquisitions (DOD IG, 2009).

Although the 2007 Gansler Commission report titled, *Urgent Reform: Army Expeditionary Contracting* primarily focused on the expeditionary contracting mission, the report findings identified the entire Army contracting enterprise need for an increase in personnel, training, and empowerment to meet the mission in the current environment (Gansler, 2007).

DOD and the Army have made great strides in improving the expertise and competencies by providing the training necessary for the Army Mission and Installation Contracting Command (MICC) Contracting workforce (1102 career field). However, the numerous GAO and DOD IG reports and other studies identify a lack of fully trained personnel within the contracting career. This suggests that a disconnection between the competencies taught by DAU and the competencies required by the 1102 career field to accomplish contracting tasks.

B. PROBLEM STATEMENT

As previously discussed, there may be a disconnection between the contracting competencies taught by DAU, and the competencies required by the 1102 workforce perform the contracting tasks. The DAU competencies can be characterized as explicit

knowledge and the 1102 workforce task related competencies can be characterized as tacit knowledge. The premise of this research is that there is a gap between explicit and tacit knowledge within the 1102 career field. Specifically at the MICC organizations, this research will assess the knowledge gap between tacit and explicit knowledge within the 1102 career field competencies and identify where those gaps exist within the competencies. Based upon the research findings, recommendations will be provided to close any of the gaps identified between tacit and explicit knowledge.

C. RESEARCH OBJECTIVES

The primary research objectives are to analyze the knowledge gap between tacit and explicit knowledge in the 1102 Army MICC workforce. Assessing the contracting knowledge gap can be a challenge because of the sheer magnitude of the required knowledge involved in DOD contract management. Aufderheide, Corrigan, and Maloy, (2011) developed a survey Air Force Operational Contracting Knowledge Assessment (OCKA-AF) to measure the tacit and explicit knowledge. Utilizing the same survey with minor modifications, this research will identify knowledge gaps in the six phases of contracting. The final objective is to provide recommendations that can be applied throughout Army Contracting Command to fill the 1102 career field knowledge gap.

D. RESEARCH QUESTIONS

The research questions for this project are as follows:

1. Where does the gap exist between explicit and tacit contracting knowledge in the six phases of contracting?
2. What consistencies are there in the knowledge gaps across the various demographics surveyed?
3. What are the recommendations to decrease the identified knowledge gaps?

E. BENEFITS OF RESEARCH

There are a number of benefits in this research to the Army Contracting Command. Commanders/directors, supervisors, contracting officers/specialists, and the customers will be the beneficiaries of this research. The research findings will allow the ability to focus in on the knowledge gaps throughout the six phases of contracting. This

will enable organizations to develop an on the job training (OJT) task management guide that will not only train contracting personnel in all of the contracting phases but also focus in on the knowledge gaps identified in the research.

Furthermore, there will be an increased visibility for supervisors and contracting officers to provide the feedback necessary through supplemental training to ensure the readiness of the contracting specialists within the 1102 career field. Supervisors will have the means to provide mentorship for career development and advancement, and to better align contracting professionals within their own organizations. Providing the contracting specialist the tools needed to perform well will increase the willingness of the 1102 workforce to stay within the Army family.

Finally, there will also be added benefit to providing the feedback from the research to DAU to assist them in better aligning contracting for competency training to reflect the MICC 1102 work environment.

F. LIMITATIONS OF RESEARCH

Three limitations are identified in the assessment tool. First, the research is limited by the use of a survey developed by Aufderheide et al. (2011) from the *Certified Federal Contracts Manager* (CFCM) study guide practice test questions for National Contract Management Association's (NCMA's) certification. It should be noted that the questions were modified slightly to fit within Army contracting, but no questions were removed or added in regards to the tacit and explicit knowledge questions. The second limitation is the survey was distributed only to MICC personnel and completion of the survey was strictly on a voluntary basis. Therefore, the number of responses may not be reflective as statistically viable to the entire MICC population.

The third limitation is the research is limited by the truthfulness of the survey respondents. There is no way to prevent respondents from utilizing external resources in order to complete the survey. This may skew the results if respondents were less than truthful by answering the questions based on use of external resources. To compound this limitation, respondents may not have the necessary self-awareness of their tacit knowledge to provide the honesty required for an accurate assessment.

G. METHODOLOGY

The methodology for this research will consist of a literature review. This review will entail an overview of the tacit and explicit knowledge focusing specifically on the differences within DOD. In addition, the literature review will discuss what is required by the DOD certification program, to include contracting standards, certifications, knowledge, and education. There are a number of journal articles and government reports available to review for the research.

Next, the information obtained through the research and review of literature will allow the team to deploy an existing survey as an assessment tool measuring an individual's tacit and explicit contracting knowledge. The assessment will be distributed to Army MICC 1102 career field workforce.

Finally, survey responses will be analyzed to determine and identify any consistencies in knowledge gaps across the MICC population. Once this analysis is complete, the team will provide the findings and recommendations to reduce the knowledge gaps in tacit and explicit knowledge. This report will be completed with a final conclusion and areas for further research.

H. ORGANIZATION OF REPORT

The research is divided into five chapters.

Chapter I–Introduction. This chapter consists of the background, problem statement, research objectives, research questions, benefits of research, limitations of research, and the methodology used in the research process.

Chapter II–Literature Review. This chapter consists of a comprehensive review of literature relevant to the research objectives. The chapter is divided into two sections. The first is geared towards the issues and analysis of tacit and explicit knowledge. The second section of the literature review focuses on the background involving education, training, and experience requirements for DOD contracting personnel.

Chapter III–Army Contracting Command (ACC). This chapter provides the organizational hierarchy for Army contracting starting with Army Material Command (AMC), ACC, through MICC and Expeditionary Contracting Command (ECC).

Chapter IV–Findings and Analysis. This chapter provides the research approach used to select and deploy the operational contracting knowledge assessment tool. In addition, it addresses assessment construction, assessment validity, assessment content, assessment population, survey response, findings, analysis, and recommendations.

Chapter V–Summary, Conclusions, and Recommendations for Further Research. This chapter presents a summary, and conclusions of the research findings, and provides recommendations for further research.

I. SUMMARY

This chapter provided a background of issues facing Army contracting. The objectives of the research were discussed, along with the research questions and benefits of the research, followed by the research methodology. The methodology included the literature review, assessment tool deployment, and data analysis. Finally, a chapter by chapter discussion was completed to address the organization of the report. The next chapter will discuss the review of the literature used for this research.

II. LITERATURE REVIEW

This chapter discusses knowledge management, education and training in contracting, the current contracting workforce environment, and the tacit and explicit knowledge in the Army.

A. INTRODUCTION

The purpose of this chapter is to introduce the two types of knowledge discussed in the knowledge management literature. The types of knowledge explained will be tacit knowledge and explicit knowledge. The research will first define and discuss the differences between tacit knowledge and explicit knowledge from a commercial standpoint, providing a non-DOD perspective. The research will then investigate DOD's approach in determining an individual's tacit knowledge and explicit knowledge through the development of the contracting competency model (CCM) and the resultant DOD contracting competency assessment. The research will then focus on the organizational processes by reviewing the contract management maturity model (CMMM) to show its relationship to the principles of CCM.

In addition, research will be conducted to identify and understand the challenges presented to the DOD contracting workforce. This will provide the background necessary to understand the introduction of the DOD standards required for the education and training of the contracting workforce (i.e., Defense Acquisition Workforce Improvement Act (DAWIA) and DAU). To conclude the literature review, a review of tacit knowledge and explicit knowledge will be completed as it applies to the Army, while exploring Army initiatives designed to enhance the Army contracting career progression.

B. KNOWLEDGE MANAGEMENT

This subsection discusses the types of knowledge, the Department of Defense contracting competency model and the contract management maturity model.

1. Types of Knowledge

The literature is readily available on the subject of tacit and explicit knowledge in relation to knowledge management. There are a number of scholarly articles and books related to the study of knowledge management and its composition.

Knowledge management encompasses different types of knowledge necessary for an individual to be fully functional in a given area. There are two types of knowledge generally recognized, tacit knowledge and explicit knowledge. Tacit knowledge is described as abstract and relayed through direct involvement of the trainer, whereas explicit knowledge is an actual formal written language (Dhanaraj, Lyles, Steensma, & Tihanyi, 2004). The article "The Different Types of Knowledge" illustrated in a figure showing tacit knowledge, a.k.a. the intuitive knowledge, defined as being non-standardized and more experience based knowledge, typically representing the largest portion of a person's knowledge base. Tacit knowledge tends to be difficult to communicate and is passed through socialization and mentoring, and is rooted in an individual's experience and learned over time. However, explicit knowledge is just the opposite and is considered standardized codified knowledge found in documents, like the written directions in a standard operating procedure (Frost, 2010).

Nonaka (1991) identifies tacit knowledge as being a learned behavior over time that is difficult to capture and refers to this as the "know-how" knowledge. This learned behavior comes with years of experience and is generally difficult to articulate because the behavior has become such a habit. Explicit knowledge is then explained as being easily communicated, such as documenting a process. This type of knowledge is formally imparted through teachers, books, and guides (Nonaka, 1991).

Nonaka teamed with Takeuchi (1995) in their book to further explain why Japanese companies have competitive advantages within knowledge creation. They state, "Tacit knowledge is highly personal and hard to formalize, making it difficult to communicate or to share with others. Subjective insights, intuitions, and hunches fall into this category of knowledge" (Nonaka & Takeuchi, 1995, p. 9). They continue to explain, "Explicit knowledge can easily be "processed" by a computer, transmitted electronically,

or stored in databases" (Nonaka & Takeuchi, 1995, p. 9). The advantages to an organization in recognizing those differences for between tacit knowledge and explicit knowledge would allow a more complete picture of an organization's knowledge base. An organization benefits by individuals having the gut feelings (tacit knowledge) we have in knowing we are making the right decision based on what we know, along with knowing the actual textbook answer (explicit knowledge).

Like Nonaka and Takeuchi, Pfeffer and Sutton (2000) also addressed tacit knowledge and explicit knowledge similarly, but simplified it by defining tacit knowledge as the "know how" and explicit knowledge as the "know what." Pfeffer and Sutton's objective was to provide a better understanding of the issues concerning the gap between tacit knowledge and explicit knowledge. They identified the gap between tacit knowledge and explicit knowledge as the "knowing-doing gap." Pfeffer and Sutton acknowledge organizations realize a knowledge gap exists, and the issues need to be addressed. However, there appears to be more talk done of what needs to happen with closing the gaps, rather than working on closing the gaps. They state organizations lack in the follow through of the corrective action implementation, thus losing out on the ability to "turn knowledge into action" (Pfeffer & Sutton, 2000). The same knowing-doing gap, as identified in the literature, also plagues DOD as will be discussed in the following sections.

2. Department of Defense Contracting Competency Model

The DOD's approach to determining the tacit knowledge and explicit knowledge necessary for the contracting workforce is the development of the DOD contracting competency model (CCM). The CCM identifies the competencies DOD requires by addressing the workforce capabilities, and provides opportunities for enhancing tacit knowledge and explicit knowledge by providing additional training and development to the DOD contracting workforce. The CCM consists of numerous contracting competencies identified by 377 subject matter experts. The model resulted in the 12 units of competence, 28 technical competencies (with 52 technical elements), and 10 professional competencies (with 10 professional elements) as depicted in Appendix A

(Defense Procurement and Acquisition Policy [DPAP], 2010). The DOD *Contracting Workforce Competency Assessment Final Report* (DPAP, 2010) defines units of competence as the high level functional areas encompassing all activities associated with a job. Competencies are defined as "observable and measurable patterns of skills, knowledge, abilities, behaviors and other characteristics that an individual needs to perform work roles or occupational functions successfully" (DPAP, 2010, p. 13). DOD describes competency elements as behavioral statements identifying a task resulting in an outcome of high significance. In order for DOD to pinpoint the gaps involving tacit knowledge and explicit knowledge, the contracting competency assessment was developed using CCM as the basis, focusing specifically on tacit knowledge. The assessment DOD developed to capture tacit knowledge gaps was explained in the March 2008 *will*. This briefing states there were three purposes for deployment of the assessment (DPAP, 2008, p. 8):

- Complete an inventory of competencies which exist in the DOD-wide contracting workforce
- Identify current and projected competency gaps
- Support workforce development in ways to best fit the strengths and weaknesses of the workforce and the needs of the contracting mission

The assessment was deployed to the entire DOD contracting community. The employee was requested to provide a self-assessment and rate the "frequency, proficiency, and criticality for each of the technical and professional competencies" (DPAP, 2008, p. 9). The self-assessment consisted of questions that first asked the employees what they believed their capabilities were in contracting. Their supervisors were then asked to measure the employees' proficiency levels in all CCM competencies; however, the questions were strictly related to tacit knowledge. Once completed, the results were intended for DOD to understand the current contracting workforce capabilities, and decide what future explicit knowledge training would be required (DPAP, 2008). This understanding of capabilities at the DOD level is an excellent beginning in identifying potential contracting competency gaps, however it lacks the entire picture of the contracting workforces capabilities since explicit knowledge was not addressed in the assessment. While it is a start in addressing the knowledge gap in the

DOD contracting workforce, it is still necessary to further develop an organization's contract management process capability by implementing a model, such as the contract management maturity model (CMMM). An existing assessment will be used that is broken into the CMMM phases to help the research team identify the gaps within tacit knowledge and explicit knowledge.

3. Contract Management Maturity Model

The CMMM can be useful when assessing the level of maturity of an organization's contract management process. An organization's maturity level could be a direct reflection of the amount of tacit knowledge and explicit knowledge possessed by the individuals of the organization. CMMM divides the contract management process into six individual phases, procurement planning, solicitation planning, solicitation, source selection, contract administration, and closeout. CMMM enables the organization to assess the maturity of the contract management process within each of these six phases (Rendon, 2011). These phases are briefly discussed below:

Procurement planning—This is the process of determining and defining the organization's needs, by developing the customer's preliminary documents, identifying budgets, determining the contract type, along with any special contract considerations.

Solicitation Planning—This is the process for the preparation of documents required to support the solicitation decision. This process includes documenting the requirements and completing the necessary market research in determining potential sources. Once this step is completed, then determining the method of solicitation, (e.g., request for quote (RFQ), request for proposal (RFP), or invitation for bid (IFB)).

Solicitation—This is the process advertising the customer's requirement, conducting pre-proposal conferences, and maintaining a bidder's list.

Source Selection—This is the process of receiving quotes/proposals/bids and completing the evaluation in accordance with evaluation criteria set forth in the solicitation.

Contract Administration—This is the process of ensuring the awardee meets the terms and conditions as set-forth in the contract.

Closeout—This is the process of verifying all requirements of the contract were met and would be considered physically complete and contractor has received final payment.

The competencies utilized in the CCM are aligned within the six phases listed above. Although the CMMM is designed to improve process capabilities within organizations, the CMMM results can identify knowledge sharing opportunities involving best practices and offer insight on the organization's workforce contracting competencies (Rendon, 2009). Even with CMMM incorporated into an organization's processes and improving the process capabilities within that organization, DOD mandates development of the contracting workforce by requiring further education and training of an individual. This will be discussed in the following section.

C. EDUCATION AND TRAINING IN CONTRACTING

This subsection discusses the Defense Acquisition Workforce Improvement Act, Defense Acquisition University and Human Capital Strategic Plan.

1. Defense Acquisition Workforce Improvement Act

The Defense Acquisition Workforce Improvement Act (DAWIA) contains the current DOD contracting professional development policy. DAWIA established the Acquisition Corps, while establishing standards for education, training (explicit knowledge), and work experience (tacit knowledge). These standards led to the establishment of the Defense Acquisition University (DAU) as a way to develop the acquisition workforce explicit knowledge through training (10 U.S.C. Ch. 87, 2001). The intent of DAWIA was to professionalize the acquisition career fields through formal training and education resulting in certification.

Specifically, acquisition is seen as possessing the attributes of a unique knowledge base requiring extended training and experience. The workforce then becomes

professional by meeting the requirements for acquisition education, training, experience, and tenure provided for under DAWIA (Snider, 1996, p. 99).

It is important to note that not everyone agrees with the implementation of DAWIA. Snider (1996) contends that DAWIA's certification requirements will become a means to an end rather than be used as the intent in developing professionals. This could result in unintended consequences, such as "ticket punching," or a means to an end to gain the DAWIA certifications required for a career field. For example, when students introduced themselves in a DAU class, the reason given for attending the class was to obtain the "certification for training required" rather than for professional development (Snider, 1996). GAO is constantly monitoring the success of the DAWIA implementation by DOD. In 2010, the GAO states, "DOD's certification training program possesses attributes of effective training programs in each of the four components of the training and development process" (2010, p. 11). However went on further to state, that DOD still does not have the mechanism to accurately assess the acquisition workforce in their proficiency and capabilities (GAO, 2010). The ability to understand the capabilities of the current DOD contracting workforce is vital to the success of the overall mission. DAWIA is the mechanism in the start of professionalizing the contracting workforce; however, training is the cornerstone to the success of DAWIA. As a result of DAWIA, the Defense Acquisition University (DAU) was established.

2. Defense Acquisition University

Established in 1992, the DAU mission is to "Provide a global learning environment to support a mission-ready Defense Acquisition Workforce that develops, delivers, and sustains effective and affordable warfighting capabilities" (DAU, 2012). Focused training is provided by DAU for the contracting career field along with 14 other acquisition-related specialties (DAU, 2014). DOD's AT&L performance learning model (PLM) helps DAU provide a learning environment that is not only focused on the training, but balances AT&L assets by providing knowledge sharing, continuous learning and mission assistance thus enhancing tacit knowledge as shown in Supplemental (DAU, 2014).

DAU's contracting "core curriculum" encompasses all three DAWIA certification levels. The 25 mandatory core classes in functional areas are delivered either by computer-based training or in residence. In addition to the required certification classes, there are "core plus" classes which are designed to be more focused in a functional area (DAU, 2014). The Engaged Learner Architecture initiative established classes that "takes e-learning to a higher level" called the "core plus" classes. These classes are optional and spread across 84 continuous learning modules offering further educational benefits (USD(AT&L), 2007, p. 28). Minimum qualifications prior to certification include more education and experience (e.g., Level I contracting certification requires 10 DAU courses, 24 semester hours in business courses, a baccalaureate degree in any field of study, and one year of contracting experience). In accordance with the Department of Defense Instruction (DODI) 5000.66, in order to maintain certification, the AT&L workforce "shall acquire a minimum of 40 continuous learning points (CLPs) every fiscal year as a goal and 80 CLPs is mandatory within two years" (DODI, 2005, p. 14).

Figure 2 depicts the actual learning hours DAU expended to achieve the DOD's AT&L PLM objectives in all four categories (i.e., training, continuous learning, mission assistance, and knowledge sharing). According to the 2012 DAU annual report, DAU provided explicit knowledge in the form of 12.5 million hours of training, 216,399 acquisition professionals, in which 30,035 were contracting professionals, completing training courses. To support DOD's increase in tacit knowledge, DAU provided 586,470 hours of mission assistance, and 1.7 million contact hours on the Defense Acquisition Portal and the Acquisition Community Connection. Of the 216,399 professionals, 58,443, or approximately 27 percent, were in-residence courses, with the vast majority (approximately 73 percent) from web-based courses (DAU, 2012). Out of the 287 continuous learning modules, 62 are contracting related. DAU provided 105 training classes, and out of those, 23 are contracting (DAU, 2012). Interestingly, 21 percent of the DAU curriculum is focused on contracting (see Figure 1).

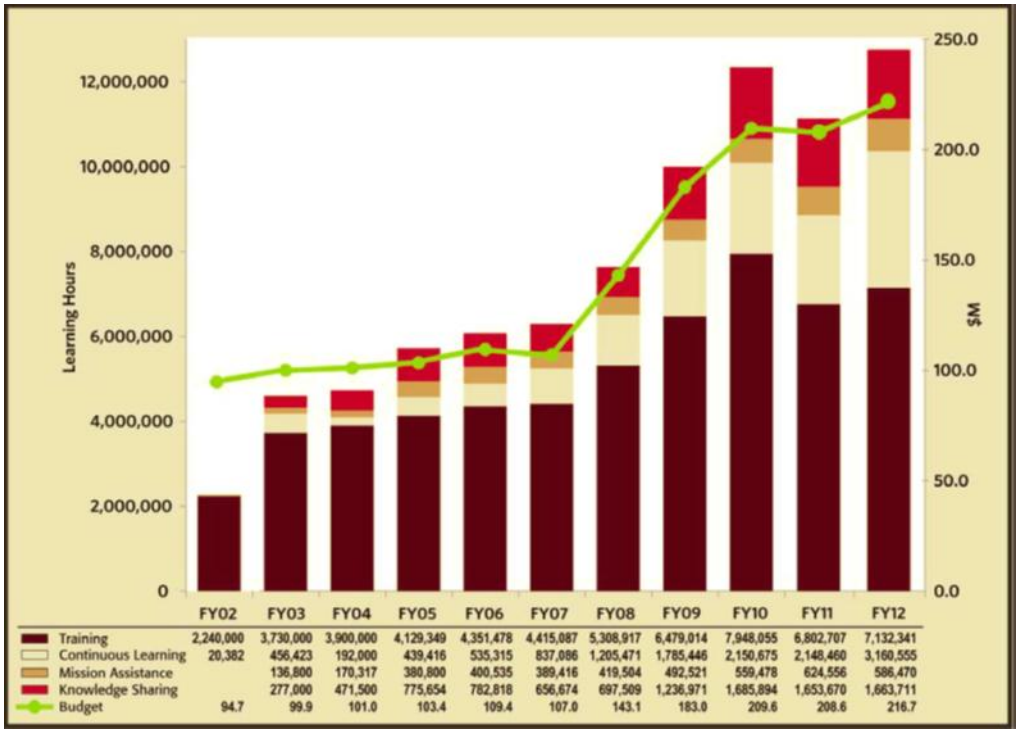


Figure 1. DAU Learning Hours Delivered (from DAU, 2012)

DAU plays a vital role in the development of acquisition professionals to include the contracting workforce. It has been instrumental in providing the necessary explicit knowledge through the training given, focusing on the regulatory portion of contracting. DAU is also trying to contribute to the expansion of tacit knowledge within contracting workforce through knowledge sharing and mission assistance. However, DAU is not the only avenue DOD is using to comply with the requirements of DAWIA. In addition, the *Human Capital Strategic Plan* was developed to manage the acquisition workforce. This will be discussed in the next section.

3. Human Capital Strategic Plan

In order to comply with the requirements of DAWIA, in 2006 USD(AT&L) developed the *Human Capital Strategic Plan* (HCSP) to manage a strategic focus on the workforce and maintain the goal on the development of a "high-performing, agile and ethical workforce" (USD(AT&L), 2007). The DOD responded with a 2010 report showing how DOD was on track to meet the objectives of the HCSP. Within this report, a

discussion regarding the Army Strategic Workforce Plan focused on specific acquisition workforce initiatives designed to assist DOD to meet the HCSP (USD(AT&L), 2010). Contracting specific initiatives within Appendix 1: DOD Strategic Human Capital Plan Update:

> The defense acquisition workforce include:
>
> - Strategic shaping. Ongoing plans to grow the acquisition career fields, with target areas that include contracting for reshaping.
> - Succession planning. Ability to properly fill senior contracting positions. Addresses recruitment, development and retention strategies.
> - Knowledge sharing. Lessons learned. Assist workforce members in accomplishing critical acquisition duties, while capturing best practices and lessons learned.

DOD is making a valiant effort to meet the goals and objectives of HCSP by focusing on recruiting, developing, and retaining personnel. By establishing the goals that consist of strategic shaping and knowledge sharing, DOD's knowledge management capabilities are enhanced in for the acquisition career fields. Based on this plan, it is evident that DOD understands the challenges in developing and maintaining an acquisition workforce. In addition, DOD contract management and DOD acquisition career field are under constant scrutiny as identified in the number of GAO and DOD IG reports written showing problem areas. Therefore, it is important to view the entire picture of the challenges DOD faces within the contracting workforce environment.

D. THE CURRENT CONTRACTING WORKFORCE ENVIRONMENT

DOD contract management remains on GAO "High Risk List" for poor business practices, lack of training, and inadequate workforce (GAO, 2013). The lack of training and limited experience is a constant challenge for the Army contracting workforce (Gansler, 2007). The Undersecretary of Defense for Acquisition, Technology & Logistics USD(AT&L) published an article in 2008 acknowledging the increased operations tempo and aging workforce puts a greater strain on the contracting workforce. For instance, "73 percent of the DOD civilian contracting workforce is part of the Baby Boomer generation or is older [than]," reducing the workforce due to retirement (Manning, Thomas, & Brooks, 2008, pp. 44–47).

Similarly, as stated in a 2009 GAO report, "Since 2001, the Department of Defense (DOD) spending on goods and services has more than doubled to $388 billion in 2008, while the number of civilian and military acquisition personnel has remained relatively stable" (p. 1). This report focused on the risks associated with the spending of government funds, an issue all too familiar to the contracting career field. In 2011, GAO added to the high risk list areas of the government susceptible to fraud, waste, and abuse (GAO, 2011). The lack of personnel and training can often times inadvertently lead to issues of fraud, waste and abuse. In addition, the DOD Inspector General issued a summary report referencing 142 reports involving acquisition and contract administration, specifically in the 12 most problematic areas as listed in Table 1 (DOD IG, 2009).

Table 1. List of 12 Problem Areas Identified in DOD IG Reports (from DOD IG, 2009)

Problem Area	Number of Reports
Completeness of Acquisition Support Data	65
Sufficiency of Requirements	50
Adequacy of Contract Pricing	52
Commercial Acquisition	10
Sole-Source Selection	32
Past Performance	8
Multiple-Award Contracting	10
Performance-Based Service Contracts	13
Oversight and Surveillance	55
Inter-Agency Contracting/Military Interdepartmental Purchase Requests	20
Potential Antideficiency Act Violations	27
Material Internal Control Weaknesses	58

Although the DOD contracting workforce remains under constant public scrutiny with negative findings, there has been a lot of improvement overall with increasing the contracting workforce knowledge through the addition of DAU courses. In all acquisition career fields, DOD contracting was ranked second in number of personnel with 30,271, an increase of 4591 personnel since fiscal year (FY) 08. According to data from AT&L Data Mart, at the conclusion of FY13, roughly 77 percent of DOD's contracting

workforce had completed their required certification training, improving rates since FY08 by seven percent (70 percent in FY08). In the Army for FY13, there were a total of 8,606 contracting personnel, (civilian and military) (AT&L, 2014). The Army has responded to the identified challenges by developing its contracting workforce by implementing an Army Civilian Training, Education, and Development System (ACTEDS) Plan Career Program-14 (CP-14)—Contracting and Acquisition Career Program. This will be discussed below.

E. TACIT AND EXPLICIT KNOWLEDGE IN THE ARMY

The ACTEDS Plan CP-14—Contracting and Acquisition Career Program provides for an overview of the program requirements, specifically Section VI of the manual references education, training, and experience. This shows education and training plays a vital role in the success of the Army contracting professional. Acquisition training, a requirement of DAWIA, provides the explicit knowledge through DAU course work, while on-the job training and experience provides the tacit knowledge. As stated in the CP-14 "Experience is characterized by action, by doing. It reinforces, explicitly and practically, what one has learned intellectually" (CPOL, 2013, p. 21). Education and training is validated on the *Acquisition Career Record Brief* (ACRB) documents by the information contained in the "training, work experience, education, awards, acquisition status, current position information, and acquisition career field certification" (CPOL, 2013, p. 14). This is a mandatory requirement and is considered the most important document for the acquisition professional. This historical document captures a detailed history identifying the completed training (explicit knowledge) and the years of service in each position (tacit knowledge), such as contract specialist, contracting officer, much like a resume, and is used by management to determine the qualifications of the individual employee (CPOL, 2013).

In order for contracting personnel to stay current with acquisition trends, and the ever-changing contract rules/regulations, DAWIA provides continuous learning to enhance and increase knowledge. Development of personnel is also valued. For that reason, the Army has established a formal career path in the shape of a pyramid, as

shown in Figure 3, to support the progression of acquisition professionals. This pyramid represents the stages of an individual's career progression within the acquisition career field, regardless of enlisted, officer, or civilian, by illustrating critical career milestones necessary to advance within the profession.

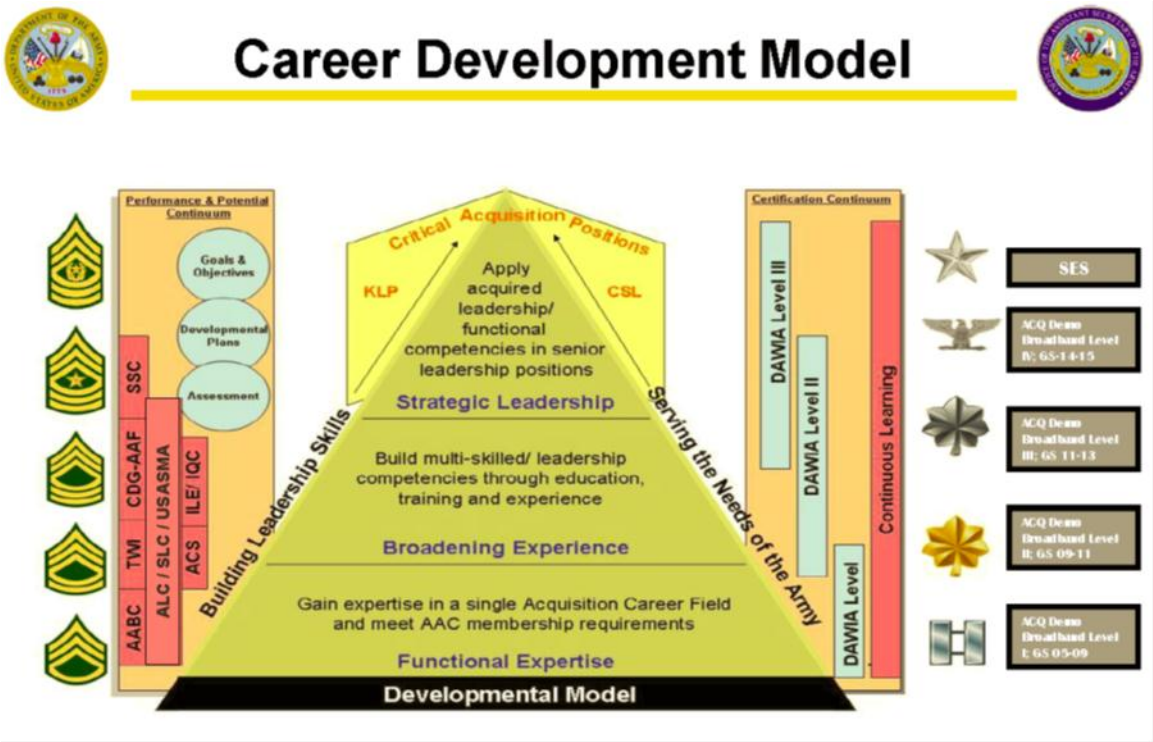


Figure 2. Army Acquisition Career Development Model—Civilian (from USAASC, 2012).

F. SUMMARY

This chapter introduced the two types of knowledge. The types of knowledge explained was tacit knowledge and explicit knowledge. The chapter then defined and discussed the differences between tacit knowledge and explicit knowledge from a commercial standpoint, providing a non-DOD perspective. DOD's approach to developing a contracting competency model (CCM) and resultant DOD contracting competency assessment was then reviewed. A focus on organizational processes was completed by reviewing the contract management maturity model (CMMM) to show a direct relationship to the principles of CCM.

By understanding challenges facing the current DOD contracting workforce environment, the development of the education, training and experience requirements necessary to improve the acquisition workforce becomes evident. To conclude the literature review, a discussion exploring tacit knowledge and explicit knowledge as it relates to the Army, to include the Army initiatives designed to enhance Army contracting career progression was presented. The next chapter discusses the ACC providing the organizational hierarchy for Army contracting starting with AMC then ACC, through MICC and ECC.

III. ARMY CONTRACTING COMMAND

This chapter discusses the AMC, the ACC, the ECC and the MICC.

A. INTRODUCTION

In this chapter, the focus is on the organizational hierarchy of Army contracting. First, the Army Material Command (AMC) will be explored. Then ACC's organizational structure, to include the subordinate commands of the ECC and the MICC, will be discussed. Last, an overview of the MICC's purpose, mission, and organizational structure will conclude the chapter.

B. ARMY MATERIEL COMMAND

The Army contracting foundation is the AMC. AMC is responsible for the Army's material readiness by providing the "technology, acquisition support, material development, logistics power projection, and sustainment" (Wilson, 2013, p. 16) for the Army warfighter. AMC has 14 primary functional areas to include organizations such as the Army Sustainment Command and the Tank and Automotive Command, both of which support weapon systems acquisition. In addition to the other areas, AMC includes the ACC, which is responsible for the contracting required to support and sustain the total force across joint military operations, as shown in Figure 3 (Wilson, 2013).

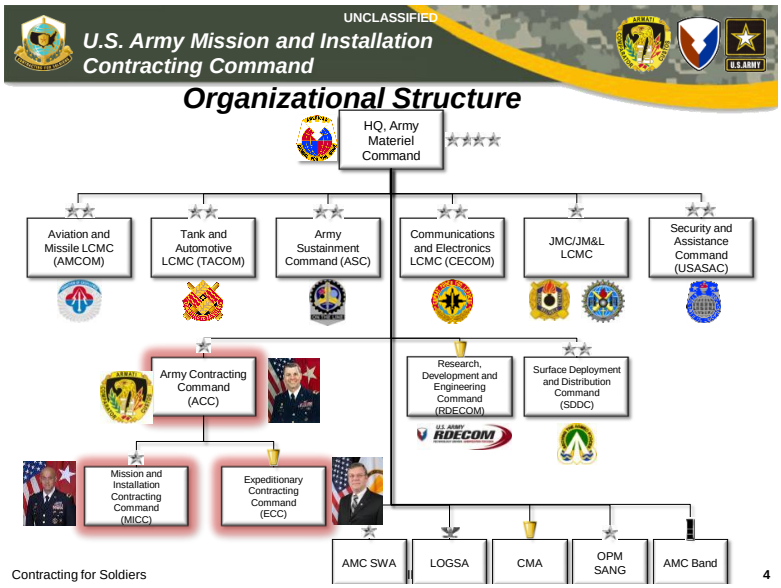


Figure 3. Army Material Command Organization (from Vollmecke, 2013).

In 2008, ACC was activated as a major subordinate command of the AMC. ACC performs the majority of all contracting work for the Army, consisting of two subordinate commands: the ECC and the MICC (Wilson, 2013).

C. ARMY CONTRACTING COMMAND

Redstone Arsenal in Alabama is the headquarters for ACC. ACC, as a two-star level command, oversees five major contracting centers that provide contracting support to AMC's program executive offices (PEO) and program managers responsible for the U.S. Army's major acquisition programs. ACC makes certain the Army warfighter has everything required to be successful, which includes anything from food, lodging, and clothing, to the weapons and trucks required to complete their missions throughout the continental United States and around the globe. With the 6,500 military and civilian employees at more than 100 locations worldwide, ACC has awarded nearly 228,000 contracts valued at more than $74 billion in FY12 (Wilson, 2013).In addition to the centers, ACC oversees two subordinate one-star commands—the ECC (offering support for the locations outside of the continental United States) and the MICC (Wilson, 2013).

D. EXPEDITIONARY CONTRACTING COMMAND

One of the two subordinate ACC one-star commands is ECC. Headquartered at Redstone Arsenal, Alabama the ECC is comprised of 657 military and 686 civilians, foreign local nationals and contractors at more than 30 locations across the globe (Wilson, 2013).The ECC is structured with "nine contracting support brigades, 17 contingency contracting battalions, 16 senior contingency contracting teams, and 92 contingency contracting teams" (Wilson, 2013, p. 26) that provide contracting support throughout the Army. Contracting support includes acquiring equipment, supplies, and services vital to Army warfighters' mission and overall well-being. In FY12, the ECC awarded nearly 23,000 new contracts and 47,000 contracting actions with a total value of excess of $21 billion (Wilson, 2013). The second subordinate ACC one-star command is the MICC.

E. MISSION INSTALLATION CONTRACTING COMMAND

Headquartered at Joint Base San Antonio-Fort Sam Houston, Texas, the MICC is the one-star command responsible for providing contracting support to Army soldiers and their families within the continental United States and Puerto Rico (Wilson, 2013). Support is provided within the MICC by the more than 1,600 military and civilian members assigned to three contracting support brigades (CSBs), one field directorate office (FDO) (Fort Eustis), and 32 field offices, along with eight contingency contracting battalions (CCBN), nine senior contingency contracting teams (SCCT), and 44 contingency contracting teams (CCT) as depicted in Figure 4.

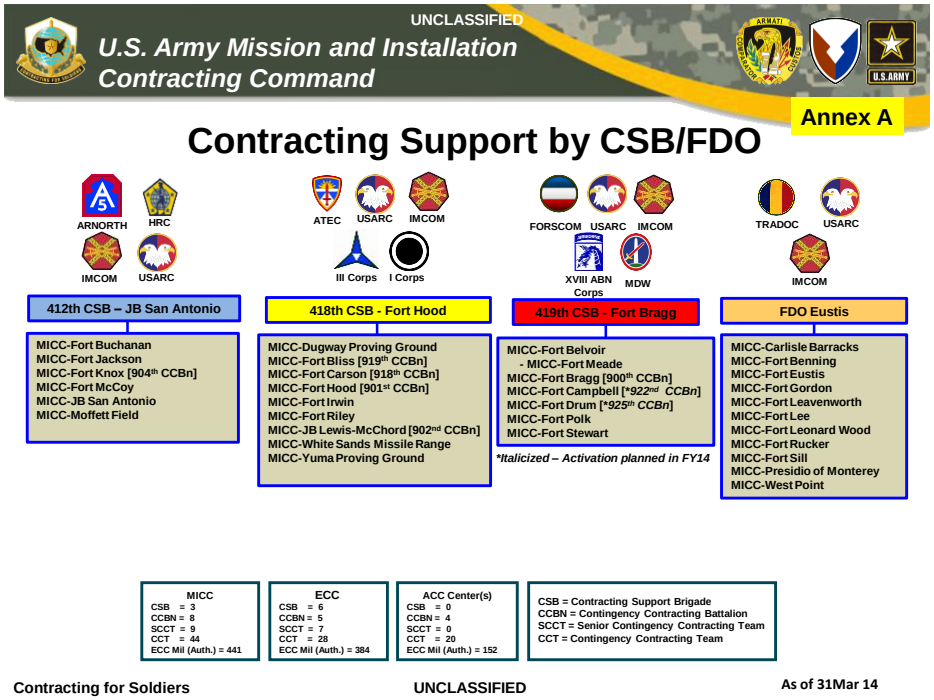


Figure 4. Annex A to O-14-084-01 MICC Organizational Chart—Contracting Support (from Gabbert, 2014).

In 2013, as part of the integration of soldiers into the contracting centers and offices throughout ACC and the MICC, three contracting support brigades (CSB) were attached to the MICC: the 419th CSB at Fort Bragg, North Carolina, the 418th CSB at Fort Hood, Texas and the 412th CSB at Joint Base San Antonio-Fort Sam Houston. These CSBs support requiring activities, which include the U.S. Army Installation Management Command, U.S. Army Forces Command, U.S. Army Training and Doctrine Command, U.S. Army North, U.S. Army Reserve Command, and U.S. Army Medical Command. Support provided by the MICC to the warfighter includes everything from acquiring the necessary equipment, supplies, and services vital to the mission and overall wellbeing of the Army soldiers and their families. The MICC contracts for services to include, but is not limited to, facilities support services (e.g., grounds, snow removal, custodial), minor military construction (under $750k), administrative services, general management consulting services, telecommunication services, engineering services, full food services, and advertising (Wilson, 2013). In FY13, the MICC awarded more than 58,000 contract actions valued in excess of $6.3 billion across the Army, which entailed

small businesses receiving more than $2.6 billion in awards (MICC, 2014). In addition, the MICC managed Government Purchase Card (GPC) Program transactions valued at over $1.3 billion (MICC, 2014).

F. SUMMARY

In this chapter, a brief overview on the organizational hierarchy of Army contracting was provided. The broader Army Material Command organization was discussed, as well as the chain of command down through the ACC subordinate commands consisting of the ECC and the MICC. The ECC was shown to support outside the continental United States (OCONUS), while the MICC's mission was located in the continental United States (CONUS). The MICC was further presented to include the composition of the workforce within the organization, along with the scope of contracting. The next chapter will discuss the research results from the operational contracting knowledge assessment tool that was completed by the MICC contracting personnel.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. FINDINGS AND ANALYSIS

This chapter identifies the procedures used to develop the assessment, along with the findings and analysis of the research data. First, the assessment construction will be discussed, followed by the validity and contents of the assessment. From there a discussion will be completed on how the selection of the sample population and data collection was developed, along with the limitations of the assessment tool. Next, we will present the findings of each assessment section within the major demographic categories. Once all findings are discussed, we will perform a gap analysis on each major demographic category, and discuss possible reasons for any gaps. Finally, recommendations will be provided based on the research completed.

A. ASSESSMENT CONSTRUCTION

The primary purpose of the knowledge assessment tool is to determine if there is a disparity between the amount of knowledge an individual perceives to have versus the actual application of knowledge involving the operational contracting knowledge across the MICC. As addressed during the literature review, there are two types of knowledge making up an individual's all-encompassing knowledge; they are tacit knowledge (experienced based) and explicit knowledge (book based). The assessment consists of three separate sections of questions: demographic, tacit, and explicit. Basic demographic and multiple-choice questions were used to build a picture of the tacit knowledge and explicit knowledge within the organization.

In order to meet the research objective, it was determined deploying a web-based assessment was the most effective way in obtaining responses required for the sample population spread out throughout the MICC. The assessment allowed respondents the ability to fully absorb the questions and provide their best possible responses at an individual pace. Any other assessment methods would not have been optimal due to the possibility of multiple answers (i.e., video teleconference or telephone surveys). The assessment was deployed with email notification provided to the MICC population along with a link to the assessment.

Consideration was given to maintaining the attention span of the respondents, along with taking into account their mission requirements, by limiting the time required to complete the assessment. The assessment consisted of 81 questions, 10 questions making up the demographic portion, along with 14 tacit knowledge questions, and 57 explicit knowledge questions. The demographic questions allowed the research team to make a comparative analysis across responses to identify possible knowledge gaps. The tacit knowledge questions were covered in the next section, consisting of multiple choice questions focusing in on the perception of the individual's knowledge base. The final section addressed the explicit knowledge questions also in a multiple choice format. Explicit knowledge questions are based on the Federal Acquisition Regulation (FAR) and were used to measure the respondent's actual application of their knowledge.

B. ASSESSMENT VALIDITY

As previously discussed in the introduction, Chapter I, the assessment was developed by Aufderheide et al. (2011). The research completed by the Aufderheide et al. (2011) team was similar in nature to the research that was being completed by the Army research team. Both teams had similar concerns in the possible knowledge gap between tacit knowledge and explicit knowledge. Therefore utilizing Aufderheide et al. (2011) assessment met the needs of the Army research team. Validity of the research conducted in the development of the assessment was a concern for the Army research team. However, based on the guidance received by our research advisor it was known that this assessment had been previously vetted and approved through their research advisor. Furthermore, their assessment focus was on the published National Contract Management Association (NCMA) study guide, which contains a practice test, geared towards preparing certified federal contracts manager (CFCM) candidates for the certification exam. Permission was then granted by Aufderheide et al. (2011) and their research advisor to utilize the assessment.

C. ASSESSMENT CONTENTS

As previously discussed, the research team utilized a modified assessment developed by Aufderheide et al. (2011) to measure tacit knowledge and explicit

knowledge. The assessment was divided into three distinct sections demographic questions, tacit knowledge questions and explicit knowledge questions. Each of the three sections will be explained further below.

1. Demographic Questions

In order to determine the patterns in knowledge gaps among the respondents, a basis of comparison is required. Through the inclusion of the demographic questions insight is gained into our survey population. For instance, the research team is able to compare the responses received across the assessment population and make a determination as to the knowledge gaps within the demographic categories based upon the aggregate results within the individual peer groups.

Demographic questions selected allow for a comparative analysis and still protect the anonymity of the respondents. The 10 demographic questions used in the assessment are related to contracting experience, training and employment status. Contracting experience related questions refer to things such as warrant authority and the years of contracting experience. Training related questions are DAWIA certification level, their preferred organizational training method and the frequency training is provided within their respective organizations. Employment status questions refer to type of service—civilian or military. It was determined since the focus of the assessment is specifically on contracting knowledge, questions with regard to gender or race was considered irrelevant, and therefore, would not be included. (Aufderheide et al., 2011)

2. Tacit Knowledge Questions

The tacit knowledge questions were used to determine an individual's experience as it relates to the six phases of contracting previously identified in the literature review (Rendon, 2011). Aufderheide et al. (2011) utilized a matrix identifying FAR parts applicable to Rendon's (2011) six phases of contracting. By building a relationship to the six phases of contracting, the research team was able to develop questions for each section of the test (Aufderheide et al., 2011).

All of the questions provided in the assessment were multiple-choice. Due to the importance of calculating the assessment results, Likert scale multiple-choice questions were used to allow for multiple comparisons between the data. The answers provided can be weighted by using values associated with each response on the Likert scale, which can be useful in determining the individual's identified experience level based on the phases of contracting. There were two Likert scale versions used within the tacit section of the assessment. (Aufderheide et al., 2011) The most common version used was:

- NONE—I do not possess proficiency in the competency
- BASIC—I am capable of handling the simplest of assignments involving this competency, but need significant assistance beyond the easiest solutions
- INTERMEDIATE—I am capable of handling many day-to-day assignments involving this competency, but may seek assistance in difficult or new situations.
- EXPERT—I am capable of handling all assignments involving this competency and may serve as a role model and/or coach to others.

One question referencing market research utilized another Likert scale version, as identified below.

- NONE—Does not influence the structure and/or contract type for the requirements that I work.
- LIMITED—Rarely influences the structure and/or contract type for the requirements that I work.
- MODERATELY—Frequently influences the structure and/or contract type for the requirements that I work.
- EXTENSIVELY—Always influences the structure and/or contract type for the requirements that I work. (Aufderheide et al., 2011)

Questions were weighted so significant results could be obtained. For example, if the tacit knowledge questions were not weighted, an individual providing a response as basic experience would have the same tacit knowledge results as someone rating themselves as an expert. Therefore utilizing the weighted Likert scale responses for the tacit knowledge questions provided the meaningful performance results the research team required. The questions were distributed equally during the weighting process and

considered the number of tacit knowledge questions within each of the six phases of contracting. (Aufderheide et al., 2011)

3. Explicit Knowledge Questions

There were 57 explicit knowledge questions used in the assessment to determine an individual's FAR-based knowledge. This section was considered the most time consuming part of the assessment because possible answers for each question must be reviewed prior to selecting an answer. Each question was multiple-choice with four possible answers, and was taken directly from the CFCM study guide practice test. (Aufderheide et al., 2011) Permission from NCMA to utilize the questions was obtained by Aufderheide et al. (2011).

Aufderheide et al. (2011) took into consideration the six phases of the contracting process as identified by Rendon in the CMMM when selecting the assessment questions. The six phases as previously discussed in the literature review are: procurement planning, solicitation planning, solicitation, source selection, contract administration, and closeout (Rendon, 2011). Questions were selected by Aufderheide et al. (2011) and then assigned to the identified respective phase(s). Permission from Aufderheide et al. (2011) to utilize the selected assessment questions was requested and obtained.

Aufderheide et al. (2011) took into consideration the number of questions that would be required to provide an effective measurement of knowledge. Our research team only made minor modifications to the questions in order to tailor the assessment to the MICC respondents. The distribution by phase of explicit knowledge questions is shown in Table 2. The explicit knowledge questions were then scored based on the possibility of one answer. (Aufderheide et al., 2011)

Table 2. OCKA-AF Question Distribution

	Procurement Planning	Solicitation Planning	Solicitation	Source Selection	Contract Administration	Closeout
Demographic	N/A	N/A	N/A	N/A	N/A	N/A
Tacit	3	4	4	4	3	4
Explicit	11	28	28	30	16	3

D. ASSESSMENT POPULATION

The knowledge assessment's target population is the Army MICC contracting personnel performing contracting duties at all levels within the organization. The assessment is only limited by the responsiveness of the targeted population. While ACC could have been included in the target population, due to necessary vetting and approval process at ACC within the time constraints of the research project limited the scope of the sample population.

The MICC was identified, as the target population required for the assessment data due to the large contracting population. A larger population provides the data necessary in determining if a knowledge gap exists. Since the primary purpose of the assessment was to measure the operational contracting knowledge, consideration for our sample population was based on the operational contracting mission.

E. LIMITATIONS OF ASSESSMENT TOOL

Three limitations are identified in the assessment tool. First, the research is limited by the use of a assessment developed by Aufderheide et al. (2011) from the *Certified Federal Contracts Manager* (CFCM) study guide practice test questions for National Contract Management Association's (NCMA's) certification. It should be noted that the questions were modified slightly to fit within Army contracting, but no questions were removed or added in regards to the tacit knowledge and explicit knowledge questions.

The second limitation is the assessment was distributed only to MICC personnel and completion of the assessment was strictly on a voluntary basis. Therefore, the number of responses may not be reflective as statistically viable to the entire MICC population.

The third limitation is the research is limited by the truthfulness of the assessment respondents. There is no way to prevent respondents from utilizing external resources in order to complete the assessment. This may skew the results if respondents were less then truthful by answering the questions based on use of external resources. To compound this limitation, respondents may not have the necessary self-awareness of their tacit knowledge to provide the honesty required for an accurate assessment.

F. ASSESSMENT RESPONSE

The initial deployment of the research survey to eligible respondents was July 18, 2011. Once distributed, results of the assessment were accepted through August 19, 2011. Due to the lack of participation, the assessment response time was extended through August 10, 2011 bringing the total length of assessment response time to 23 days.

We encountered several challenges in conducting the assessment. Although we attempted to act judiciously in the deployment of the assessment and allow potential respondents adequate time to respond, we reasonably assumed the following factors may have contributed to eligible respondents ignoring, declining or not completing the assessment:

- Workload (existing or impending increased workload due to end of fiscal year (EOFY) requirements)
- Lack of interest (the assessment was completely voluntary)
- Absence (due to deployment, temporary duties, illness, or personal reasons)
- Fear of attribution

As discussed in the research methodology, the assessment was deployed to 1107 eligible MICC contracting personnel, to include military and civilians. Of the eligible pool, 219 individuals consented to take the assessment showing a response rate of 19.8 percent.

While evaluating the number of aggregate responses, the research team discovered many respondents did not fully complete the assessment, which resulted in a skewed depiction of results. In order to provide a more accurate picture it was determined that it was necessary to scrub the data to account for the discrepancies in the lack of responses. The research team made the determination of what should constitute a majority of responses. It was determined a response to 50 percent or more of the questions would be considered a majority. The tacit knowledge questions only made up 20 percent of the total assessment, but the research team felt once the majority was determined for the tacit knowledge, the responses to the explicit knowledge questions was more indicative of the knowledge base of the MICC population. Although respondents may not have answered all of the explicit knowledge questions, an assumption was made if they answered 50 percent or more of the questions they appeared to have fully committed to participating in the assessment. The process resulted in the exclusion of 19 respondents, who did not answer the majority of the tacit knowledge questions, and an additional 53 respondents were removed who did not answer the majority of the explicit questions; resulting in of the 219 who consented, 139 actually completed the knowledge assessment. Overall, the completed assessment response rate was 12 percent after cleaning the database. The scrubbed database was then used to analyze the data and gather results, which is further discussed throughout this chapter.

G. FINDINGS

We conducted analysis in the following areas: career series, DAWIA certification level, years of experience, warrant level, preferred training method, training frequency, and overall contracting career field. The results of the findings are discussed below.

1. Results by Career Series

Figure 5 provides a breakout of responses by the career series of the respondents. Of the 139 complete responses received, 128 respondents were civilians, nine respondents were military, and one respondent did not answer the question. The responses for each of these career series are presented in the subsequent sections.

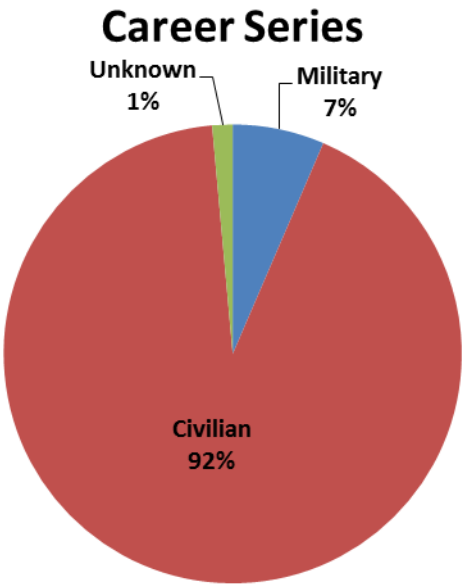


Figure 5. MICC Responses by Career Series

a. Military

There were nine Army military, currently working in the contracting career field, who completed the assessment. The experience (determined by years) and training (determined by the Defense Acquisition Workforce Improvement Act (DAWIA) certification levels) of each military respondent vary.

Figure 6 represents the tacit knowledge and explicit knowledge assessment results of the Army military according to the six phases of contracting. Concerning the tacit knowledge results, the military who completed the assessment had a slightly higher weighted average in the contract administration phase. The highest weighted averages in the explicit knowledge area for the military respondents were the solicitation planning, solicitation, source selection and contract closeout phases. The procurement planning phase was only slightly higher in the explicit knowledge area. The overall results show that explicit knowledge exceeds tacit knowledge in five of the six phases.

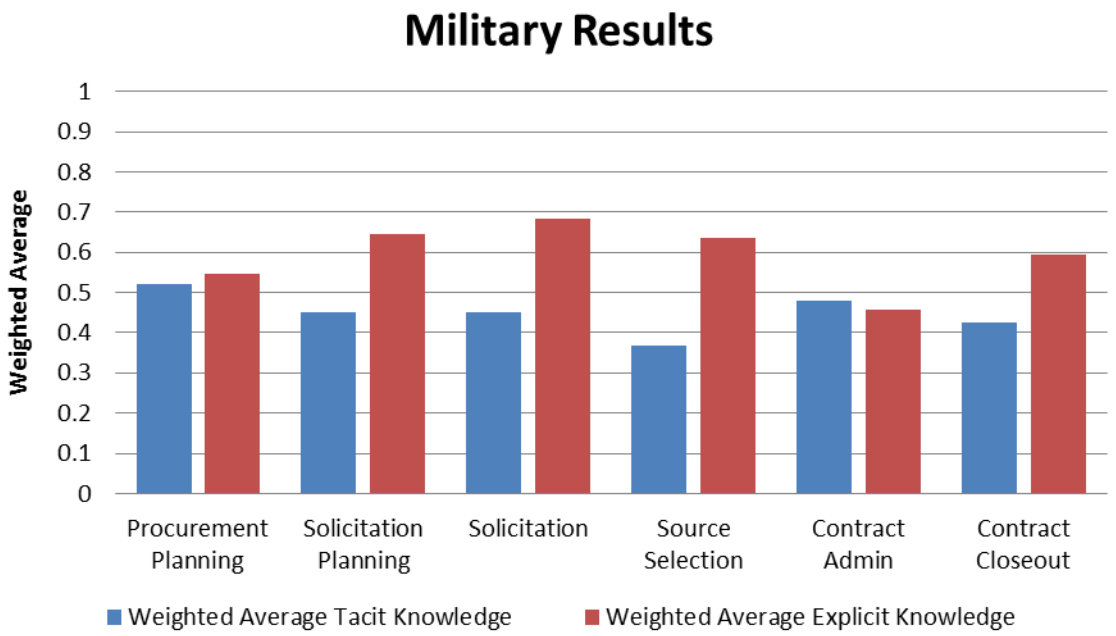


Figure 6. MICC Military Assessment Results

b. Civilian

There were 128 Department of the Army civilian employees, currently working in the contracting career field, who completed the assessment. These civilian employees have various levels of experience (determined by years) and training (determined by DAWIA certification levels).

Figure 7 represents the tacit knowledge and explicit knowledge assessment results for the Army civilians in contracting, differentiated by the six phases of contracting. Tacit knowledge levels in this category slightly exceeded explicit knowledge levels in the contract administration phase. The contract closeout phase tacit knowledge and explicit knowledge were equally balanced. Explicit knowledge is greater in the procurement planning, solicitation planning, solicitation, and source selection phases. Similar to the military, the highest weighted averages in explicit knowledge are evident in solicitation planning, solicitation, and source selection phases. Overall, explicit knowledge levels exceed tacit knowledge levels in four of the six phases.

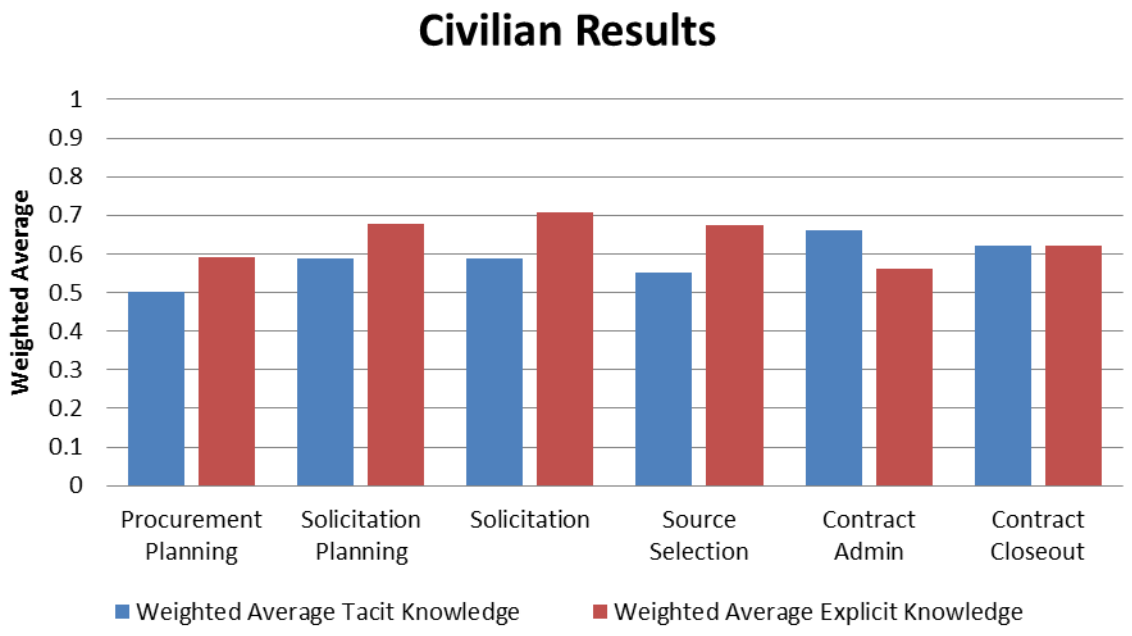


Figure 7. MICC Civilian Assessment Results

c. Unknown

There was one respondent who chose not to answer the question; currently working in the contracting career field and who completed the assessment. Rather than showing the results graphically they will only be discussed verbally because with only having one respondent in this category, results are very misleading and not a true depiction of the MICC population. Overall, similar to the military and civilian categories, explicit knowledge exceeds tacit knowledge in the procurement planning, solicitation planning, solicitation, and source selection phases.

2. Results by DAWIA Certification Level

Figure 8 shows the breakout of the completed responses received by respondents DAWIA contracting certification level. Of the 139 completed responses received, 17 respondents held no DAWIA contracting certification, 15 respondents held DAWIA Level I contracting certification, 60 respondents held DAWIA Level II contracting

certification, and 47 held DAWIA Level III contracting certification. Data pertaining to the differing certification levels of the respondents are presented in subsequent sections.

Since DAWIA certifications are career specific and consider years of experience and training of the individual, this category of demographics includes all the career series and years of experience of the assessment respondents.

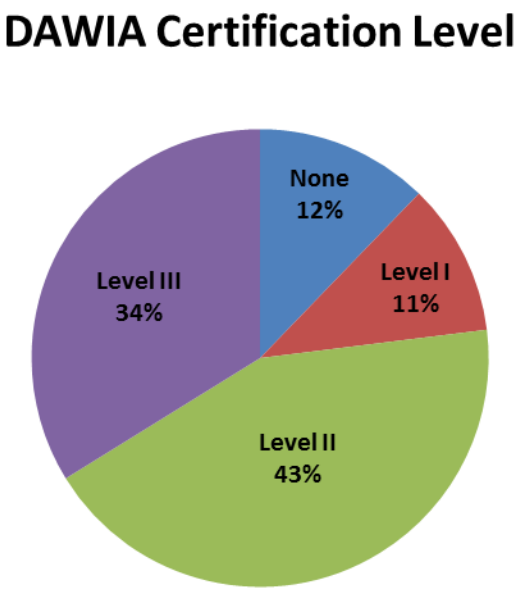


Figure 8. Responses by DAWIA Certification Level

a. Non-DAWIA Level Certified

Of the total number of assessment respondents who completed the assessment, 17 identified themselves as possessing no DAWIA contracting certifications. These respondents are included across all areas of the demographics surveyed, such as career series and years of experience. The results are displayed in Figure 9.

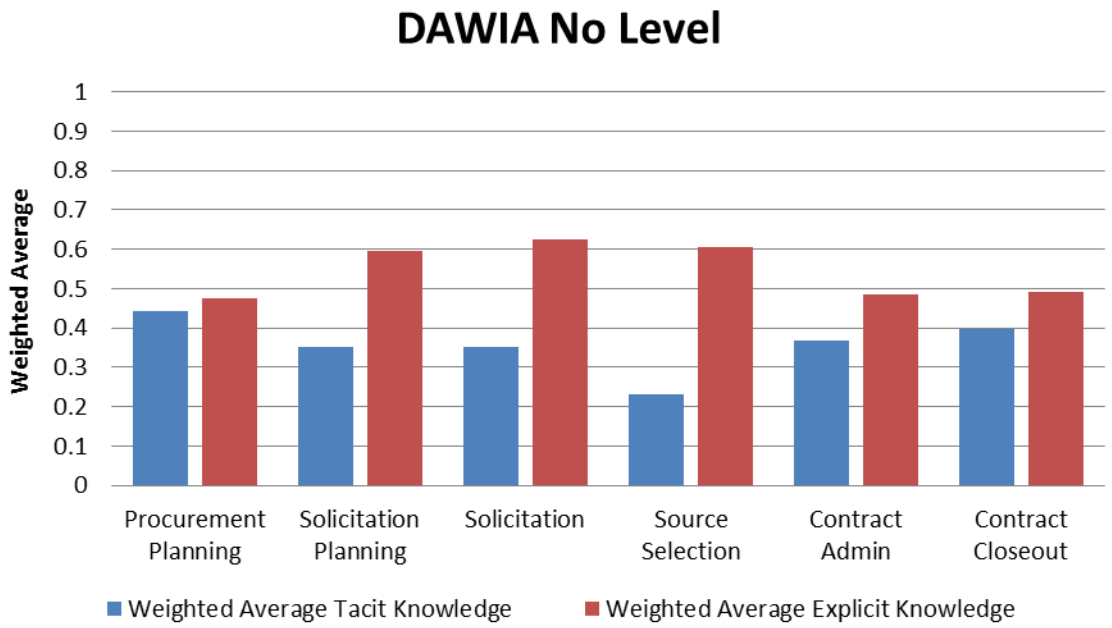


Figure 9. No DAWIA Level Certified

For respondents within this demographic claiming to have no DAWIA certification, explicit knowledge in all contracting phases eclipses that of tacit knowledge. In regards to explicit knowledge, solicitation planning, solicitation, and source selection phases are the most prominent. Overall, explicit knowledge exceeded tacit knowledge in all phases.

b. DAWIA Level I Certified

There were a total of 15 respondents who identified themselves as DAWIA Level I certified. These 15 respondents are included across all areas of the demographics surveyed, such as career series and years of experience. The assessment results are depicted in Figure 10.

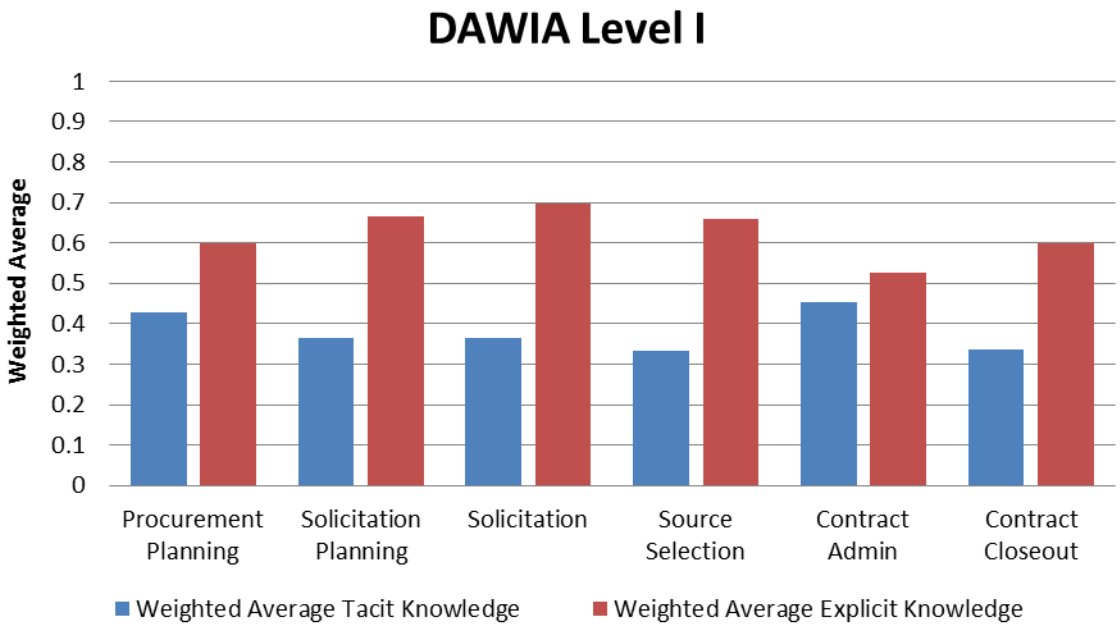


Figure 10. DAWIA Level I Certified

For respondents within this demographic claiming to have DAWIA Level I certification, explicit knowledge in all contracting phases eclipses that of tacit knowledge. In regards to explicit knowledge, solicitation planning, solicitation and source selection phases are the most prominent. Overall, explicit knowledge exceeded tacit knowledge in all phases.

c. DAWIA Level II Certified

There were a total of 60 respondents who identified themselves as DAWIA Level II certified. These respondents are included across all areas of the demographics surveyed, such as career series and years of experience. The assessment results are depicted in Figure 11.

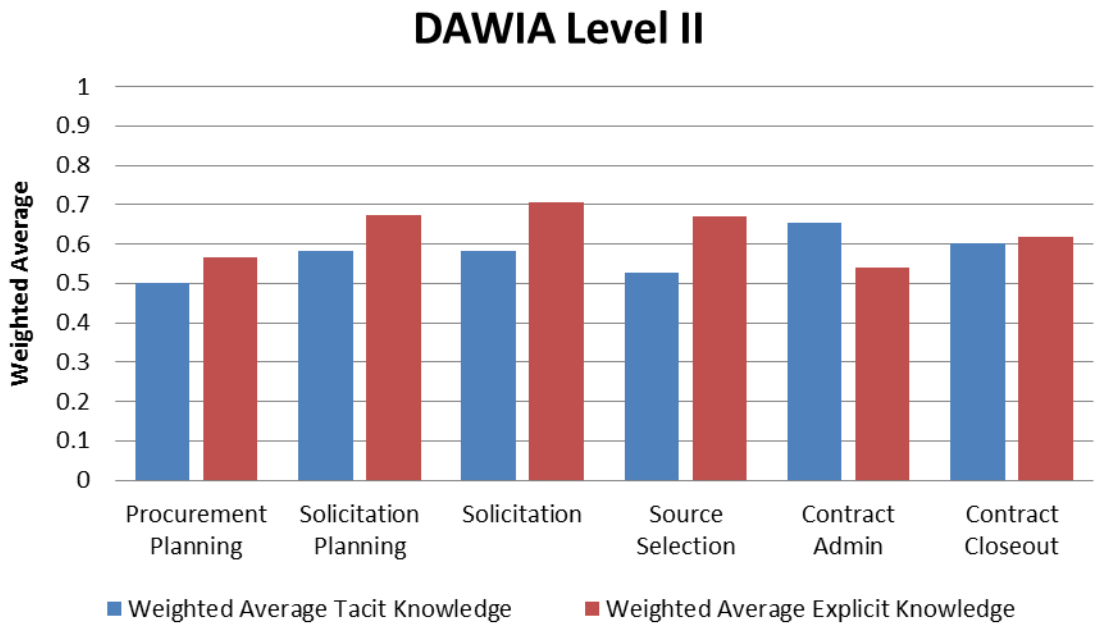


Figure 11. DAWIA Level II Certified

Figure 11 represents the tacit knowledge and explicit knowledge assessment results for DAWIA Level II contracting certification, differentiated by the six phases of contracting. Tacit knowledge levels in this category slightly exceeded explicit knowledge levels in the contract administration phase. There is a significant increase in tacit knowledge after DAWIA Level I certification. The contract closeout phase tacit knowledge and explicit knowledge were equally balanced. explicit knowledge is greater in the procurement planning, solicitation planning, solicitation, and source selection phases. Overall, explicit knowledge levels exceed tacit knowledge levels in five of the six phases.

d. DAWIA Level III Certified

There were a total of 47 respondents who identified themselves as DAWIA Level III certified. These respondents span across all areas of the demographics surveyed, such as career series and years of experience. Their results are shown in Figure 12.

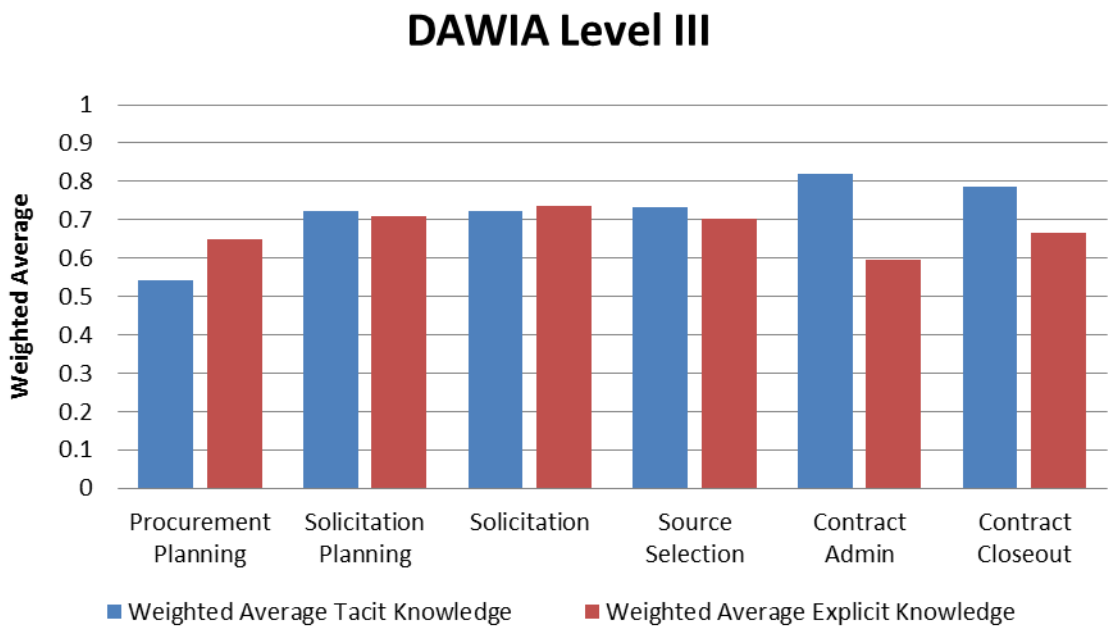


Figure 12. DAWIA Level III Certified

Respondents with a DAWIA Level III contracting certification have higher tacit knowledge levels in contract administration and contract closeout phases. In the solicitation planning, solicitation, and source selection phase, tacit knowledge and explicit knowledge were equally balanced. Explicit knowledge levels slightly exceeded tacit knowledge levels in the procurement planning phase. Overall, tacit knowledge and explicit knowledge levels for all phases of contracting were high, compared to DAWIA Level I and II respondents.

3. Results by Years of Experience

Figure 13 displays the number of responses categorized by years of contracting experience. Of the 139 complete responses received, 28 respondents had zero to two years of experience, 31 respondents had two to four years of experience, 16 respondents had four to six years of experience, and 64 respondents had six or more years of experience. The responses for each of these experience categories are presented in the subsequent sections.

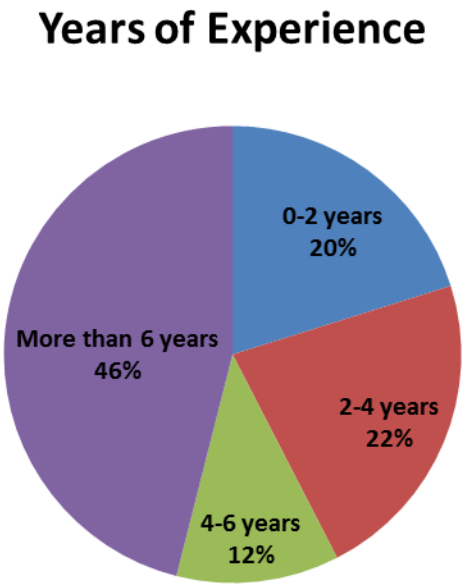


Figure 13. Responses by Years of Experience

a. Respondents with 0–2 Years of Experience

There were 28 assessment respondents who identified themselves as having between zero to two years of contracting experience. This number represents years of contracting experience across the different career series with varying certification levels. Their results are shown in Figure 14.

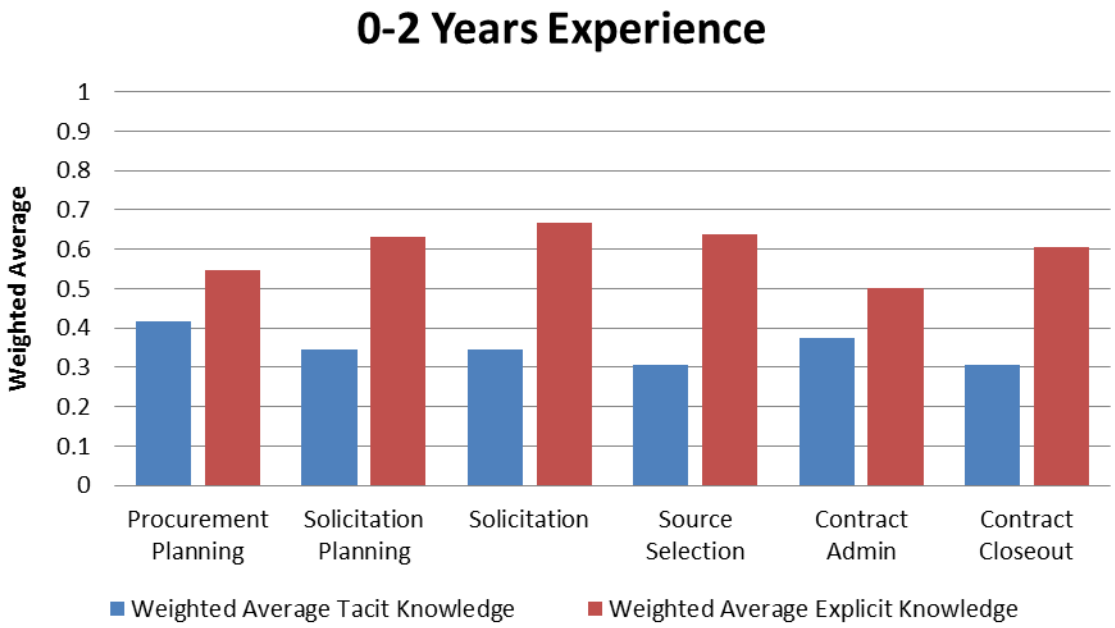


Figure 14. Respondents with 0–2 Years of Experience

Respondents with zero to two years of contracting experience showed explicit knowledge levels significantly exceeded tacit knowledge in all phases. The largest tacit knowledge-explicit knowledge gap appears in the solicitation planning, solicitation, source selection, and contract closeout phases, with the procurement planning and contract administration phases only slightly behind. Overall, explicit knowledge exceeds tacit knowledge in all six phases.

b. Respondents with 2–4 Years of Experience

There were 31 assessment respondents who identified themselves as having between for two to four years of contracting experience. This number represents years of contracting experience across the different career series with varying certification levels. Their results are shown in Figure 15.

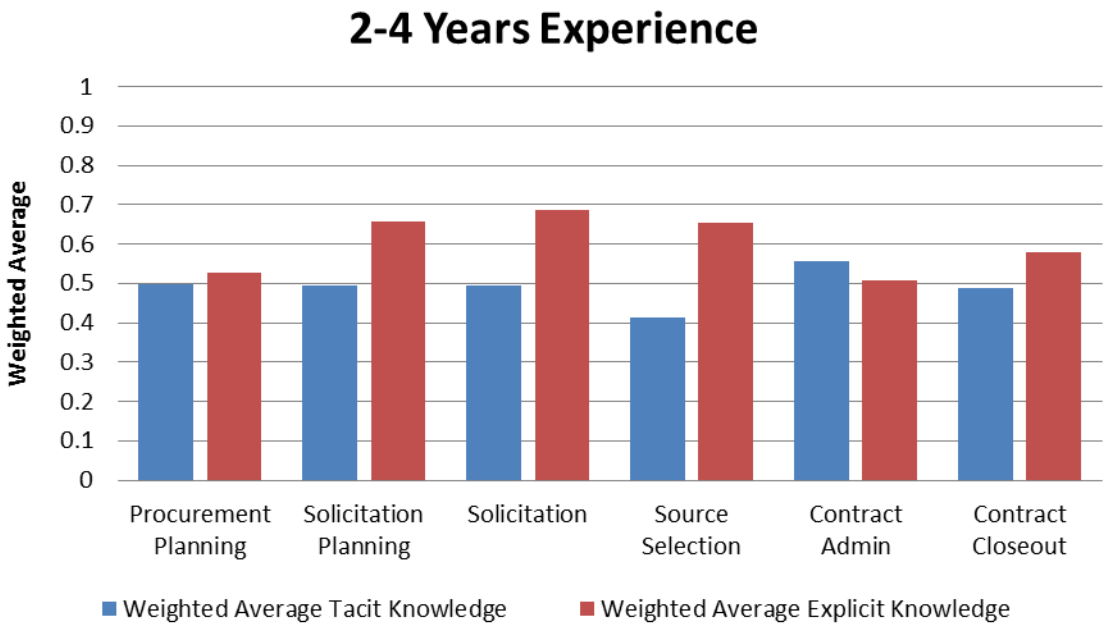


Figure 15. Respondents with 2-4 Years of Experience

Respondents with two to four years of contracting experience generally have more explicit knowledge than tacit knowledge. In addition, all levels of tacit knowledge have increased over those respondents with zero to two years of experience. Explicit knowledge levels exceed tacit knowledge levels in all phases except contract administration. The solicitation planning, solicitation, and source selection phases have larger gaps, while procurement planning, contract administration, and contract closeout phases have smaller gaps. Overall, explicit knowledge exceeds tacit knowledge in five of the six phases.

c. Respondents with 4–6 Years of Experience

There were 16 assessment respondents who identified themselves as having between four to six years of contracting experience. This number represents years of contracting experience across the different career series with varying certification levels. Their results are shown in Figure 16.

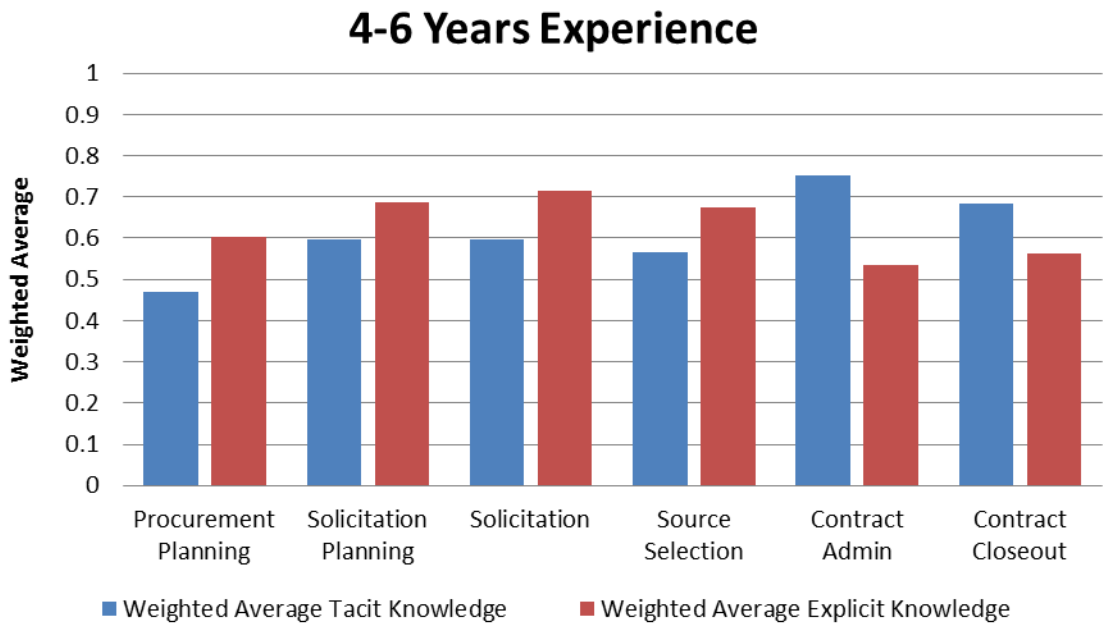


Figure 16. Respondents with 4-6 Years of Experience

Respondents with four to six years of contracting experience have more explicit than tacit knowledge in each phase except for contract administration and contract closeout. Similar to respondents with two to four years of experience, the largest gaps appear in solicitation planning, solicitation, and source selection. Unlike the categories with less years of experience, there was a significant increase of tacit knowledge over explicit knowledge for contract administration and contract closeout. Overall, explicit knowledge exceeds tacit knowledge in four of the six phases.

d. Respondents with Six or More Years of Experience

There were 64 assessment respondents who identified themselves as having 6 or more years of contracting experience. This number represents years of contracting experience across the different career series with varying certification levels. Their results are shown in Figure 17.

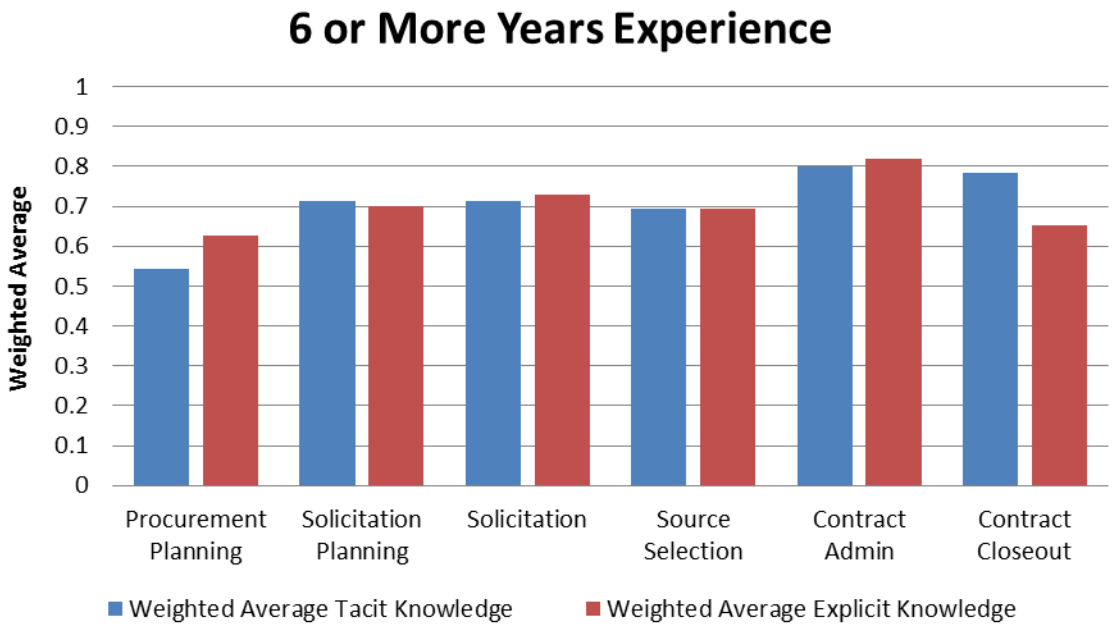


Figure 17. Respondents with Six or More Years Of Experience

Respondents with six or more years of contracting experience have higher tacit knowledge levels in the contract closeout phase. In the solicitation planning, solicitation, source selection, and contract administration phases tacit knowledge and explicit knowledge were equally balanced. Explicit knowledge levels slightly exceeded tacit knowledge levels in the procurement planning phase. Overall, tacit knowledge and explicit knowledge levels for all phases of contracting were high compared to those with less years of experience.

4. Results by Warrant Level

Figure 18 displays the number of responses categorized by warrant level. Of the 139 complete responses received, 76 respondents were not warranted, seven respondents had a warrant for less than $1M, 19 respondents had a warrant between $1M and $10M, one respondent had a warrant that was greater than $10M but not unlimited, 35 respondents had an unlimited warrant, and one respondent chose not to answer the question. The responses for each of these warrant categories (except for the respondent who chose not to answer the question) are presented in the subsequent sections.

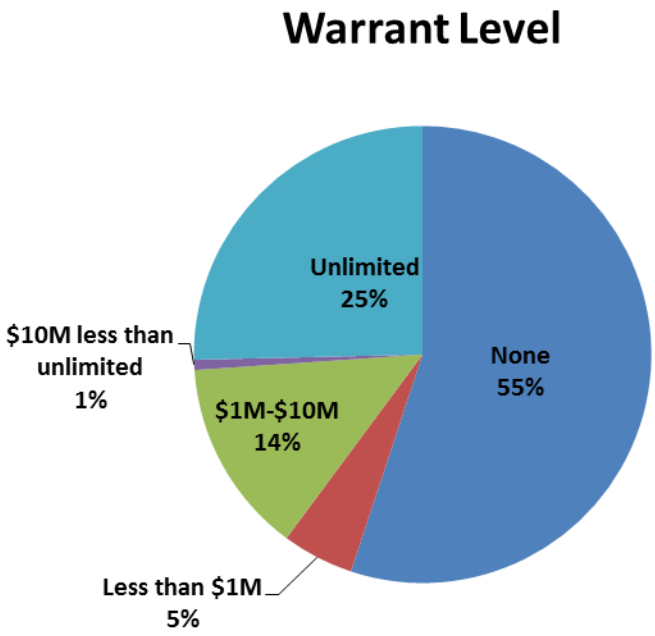


Figure 18. Response by Warrant Level

a. Respondents with No Warrant

There were 76 assessment respondents who identified themselves as having no warrant. These respondents span across all areas of the demographics surveyed, such as career series and years of experience. Their results are shown in Figure 19.

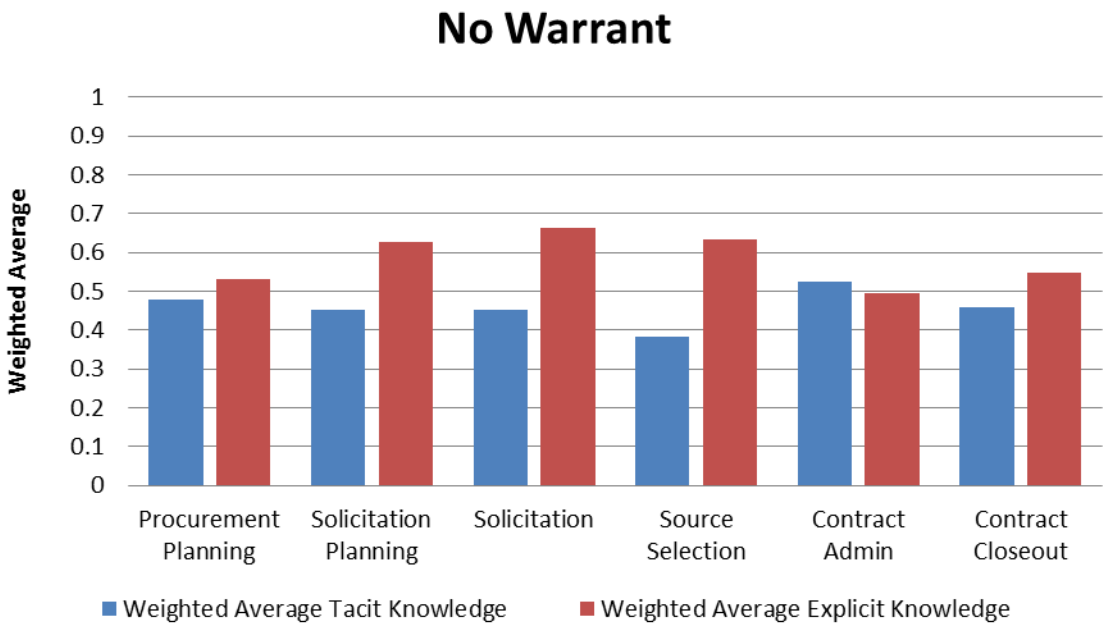


Figure 19. Respondents with No Warrant

Respondents having no warrant have lower tacit knowledge levels in each phase with the exception of contract administration phase. In the procurement planning and contract administration phases tacit knowledge and explicit knowledge were nearly equally balanced. The largest knowledge gaps appear in the solicitation and source selection phases. Overall, explicit knowledge levels exceed tacit knowledge levels in five of the six phases.

b. Respondents with a Limited Warrant (Less than $1 million)

There were seven assessment respondents who identified themselves as having a warrant of less than $1M. These respondents span across all areas of the demographics surveyed, such as career series and years of experience. Their results are shown in Figure 20.

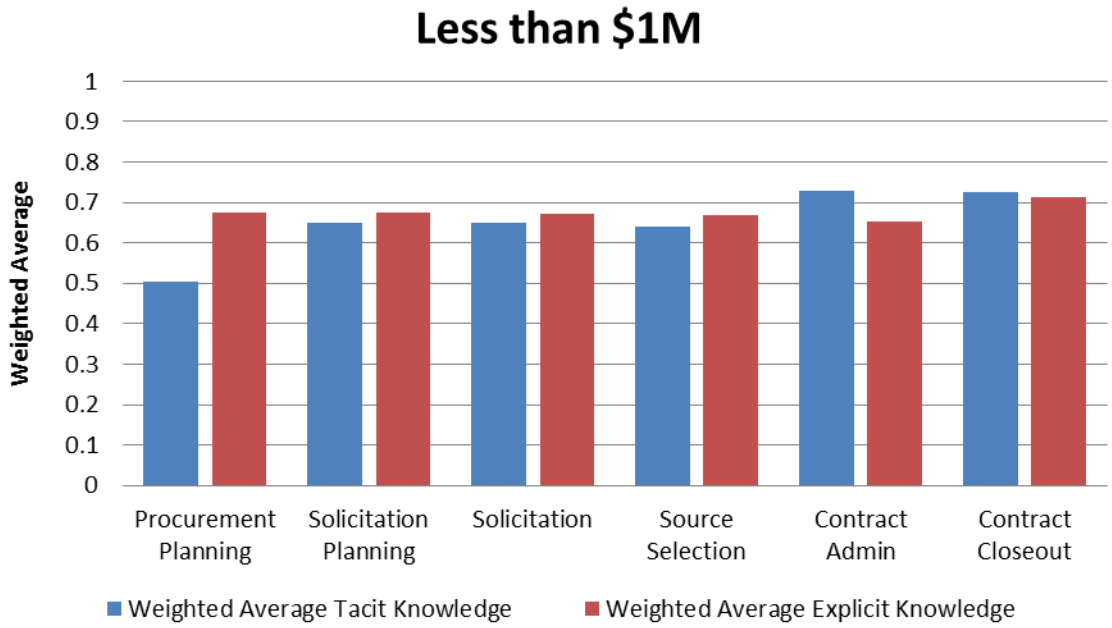


Figure 20. Respondents with a Warrant for Less Than $1M

Respondents with a warrant for less than $1M have higher explicit knowledge levels in the procurement planning phase. In the solicitation planning, solicitation, source selection, and contract closeout phases tacit knowledge and explicit knowledge were equally balanced. Tacit knowledge levels slightly exceeded explicit knowledge levels in the contract administration phase. Overall, tacit knowledge and explicit knowledge levels for four out of the six phases of contracting were nearly equal.

c. Respondents with a Limited Warrant ($1 Million–$10 Million)

There were 19 assessment respondents who identified themselves as having a warrant between $1M and $10M. These respondents span across all areas of the demographics surveyed, such as career series and years of experience. Their results are shown in Figure 21.

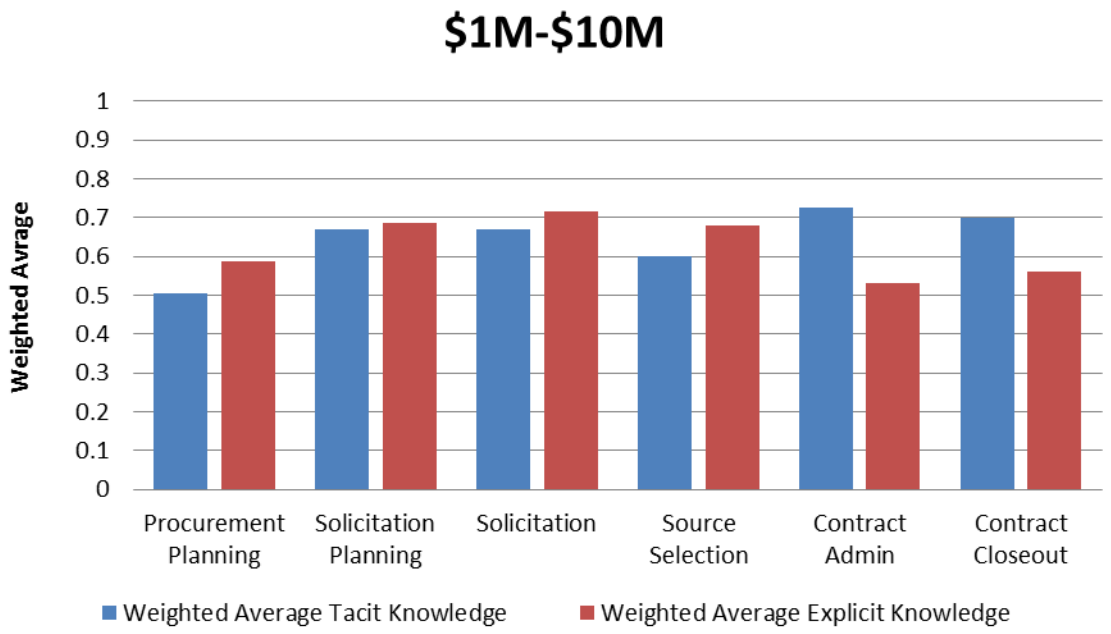


Figure 21. Respondents with a Limited Warrant (Between $1M and $10M)

Figure 21 represents the tacit knowledge and explicit knowledge assessment results for respondents with warrants between $1M and $10M, differentiated by the six phases of contracting. Explicit knowledge levels in this category slightly exceeded tacit knowledge levels in the procurement planning and source selection phases. In the solicitation planning and solicitation phases tacit knowledge and explicit knowledge were equally balanced. Tacit knowledge is greater than explicit knowledge in the contract administration and closeout phases. Overall, explicit knowledge levels exceed tacit knowledge levels in four of the six phases.

d. Respondents with a Limited Warrant ($10 Million, But Less Than Unlimited)

There was one assessment respondent who identified his/herself as having a warrant of $10M, but less than unlimited. This respondent spans across all areas of the demographics surveyed, such as career series and years of experience. Rather than showing the results graphically they will only be discussed verbally because with only having one respondent in this category, results are very misleading and not a true

depiction of the MICC population. Overall, the respondent's explicit knowledge in this category far exceeded their tacit knowledge.

e. Respondents with an Unlimited Warrant

There were 35 assessment respondents who identified themselves as having an unlimited warrant. These respondents span across all areas of the demographics surveyed, such as career series and years of experience. Their results are shown in Figure 22.

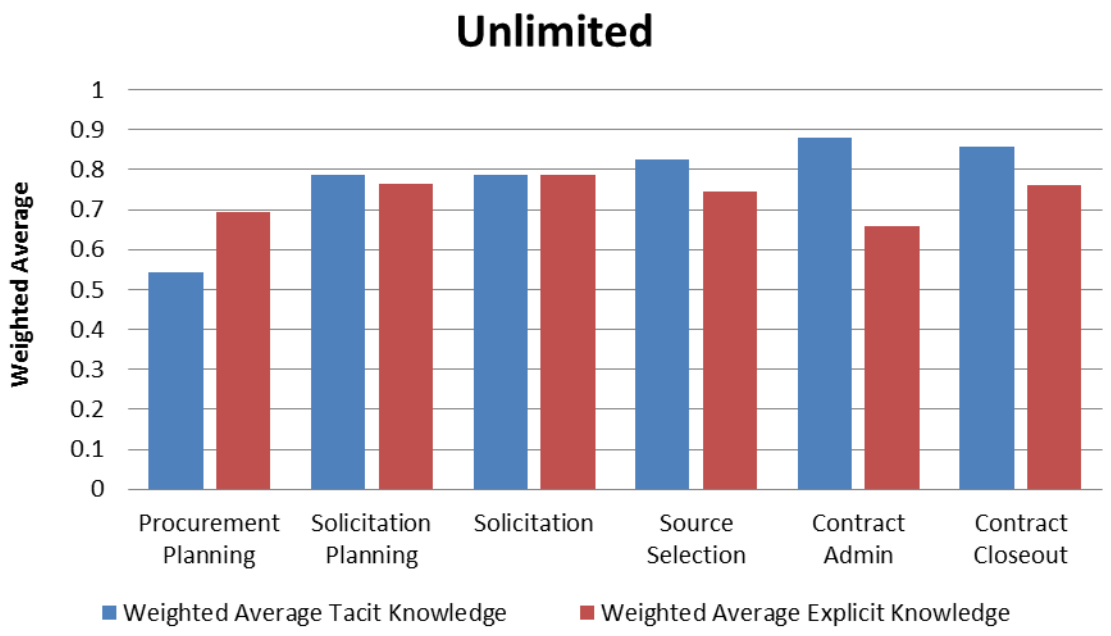


Figure 22. Respondents with an Unlimited Warrant

Respondents with an unlimited warrant have higher tacit knowledge levels in each phase with the exception of procurement planning and solicitation phases. The largest knowledge gaps appear in the procurement planning and contract administration phases. Overall, tacit knowledge levels exceed explicit knowledge levels in four of the six phases.

Figure 22 represents the tacit knowledge and explicit knowledge assessment results for respondents with unlimited warrants, differentiated by the six phases of

contracting. Explicit knowledge levels in this category slightly exceeded tacit knowledge levels in the procurement planning phase. The solicitation planning and solicitation phases for tacit knowledge and explicit knowledge levels were equally balanced. Tacit knowledge is greater than explicit knowledge in the source selection, contract administration and closeout phases. Overall, tacit knowledge and explicit knowledge levels for all phases of contracting were high compared to those without a warrant and with those with a limited warrant.

5. Results by Preferred Training Method

Figure 23 displays the number of responses categorized by preferred method of training. Of the 139 complete responses received, 12 respondents preferred DAU courses as the method of training, four respondents preferred the FAR as the method of training, and 123 respondents preferred OJT as the method of training. The responses for each of these training categories are presented in the subsequent sections.

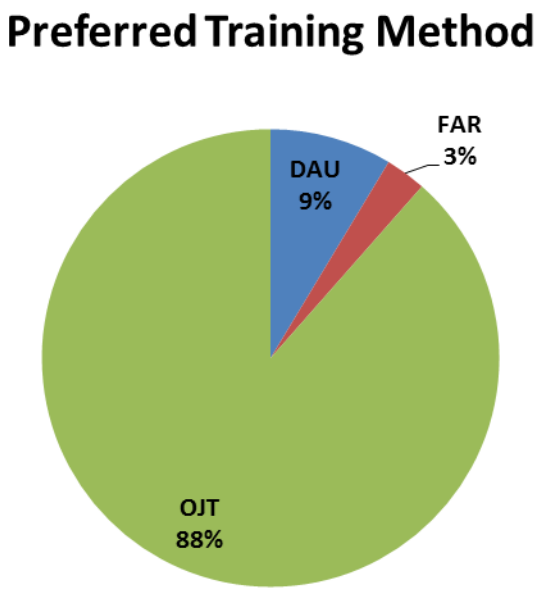


Figure 23. Responses by Preferred Training Method

a. Respondents Preferring DAU Training

There were 12 assessment respondents who identified themselves as preferring DAU courses for a method of training. These respondents span across all areas of the demographics surveyed, such as career series and years of experience. Their results are shown in Figure 24.

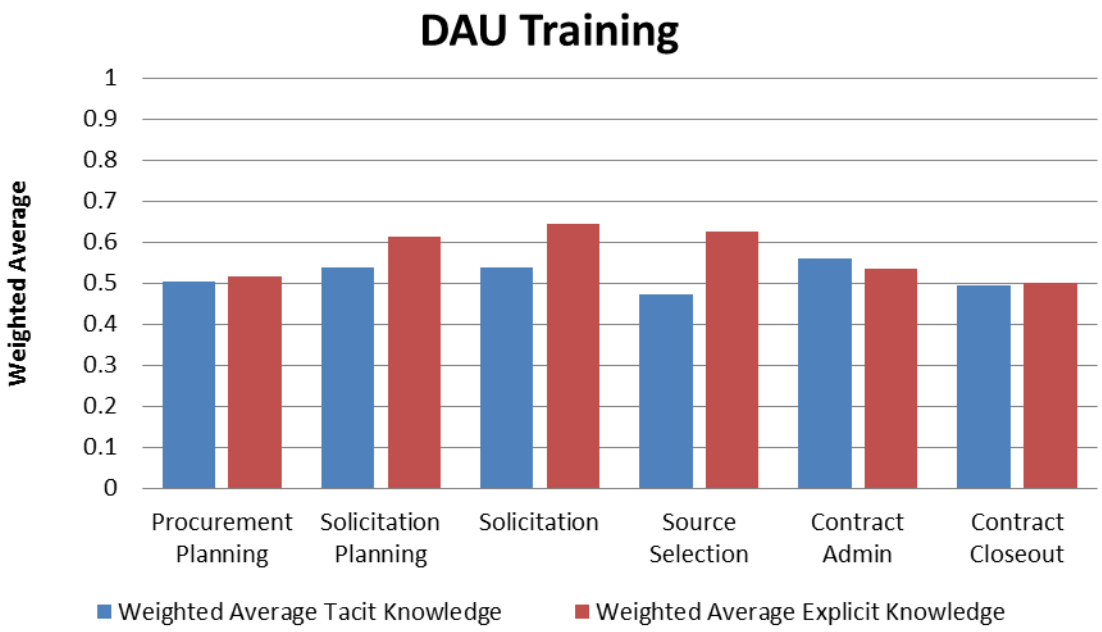


Figure 24. Respondents Preferring DAU Training

Respondents preferring DAU training have higher explicit contracting knowledge levels in the solicitation planning, solicitation and source selection phases. The procurement planning, contract administration and contract closeout phases for tacit knowledge and explicit knowledge level were equally balanced. Overall, explicit knowledge levels generally exceed tacit knowledge levels in four of the six phases.

b. Respondents Preferring FAR Training

There were four assessment respondents who identified themselves as preferring the FAR as a method of training. These respondents span across all areas of the

demographics surveyed, such as career series and years of experience. Their results are shown in Figure 25.

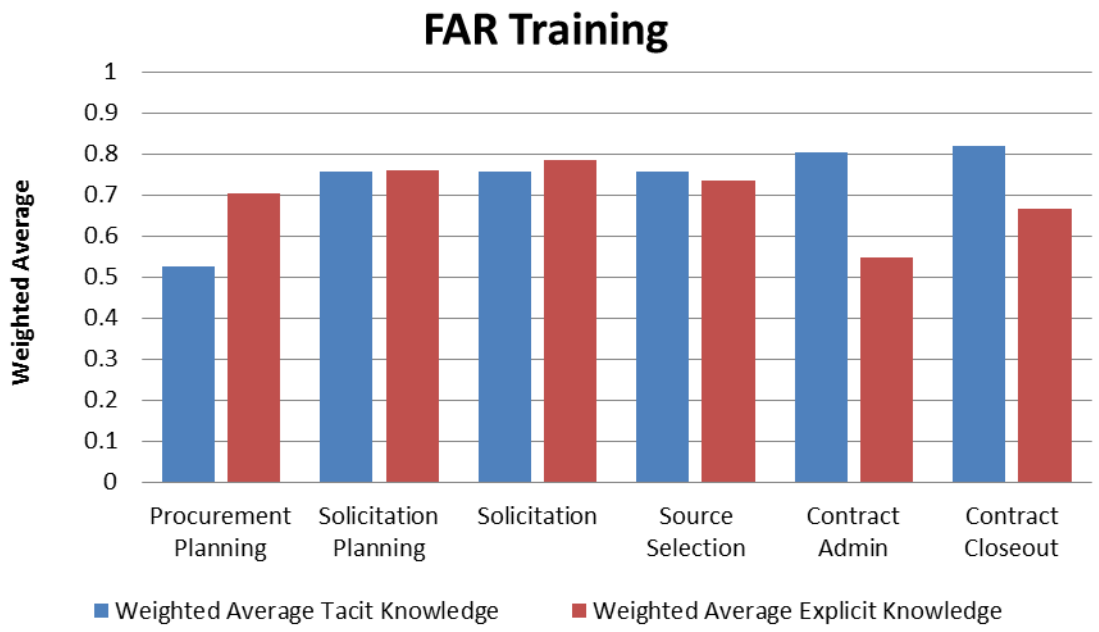


Figure 25. Respondents Preferring FAR Training

Respondents preferring FAR training have higher tacit knowledge levels in the contract administration and contract closeout phases. In the solicitation planning, solicitation, and source selection phases, tacit knowledge and explicit knowledge were equally balanced. Explicit knowledge levels exceeded tacit knowledge levels in the procurement planning phase. Overall, tacit knowledge and explicit knowledge levels for all phases of contracting were high.

c. Respondents Preferring On-The-Job Training

There were 123 assessment respondents who identified themselves preferring OJT as the method of training. These respondents span across all areas of the demographics surveyed, such as career series and years of experience. Their results are shown in Figure 26.

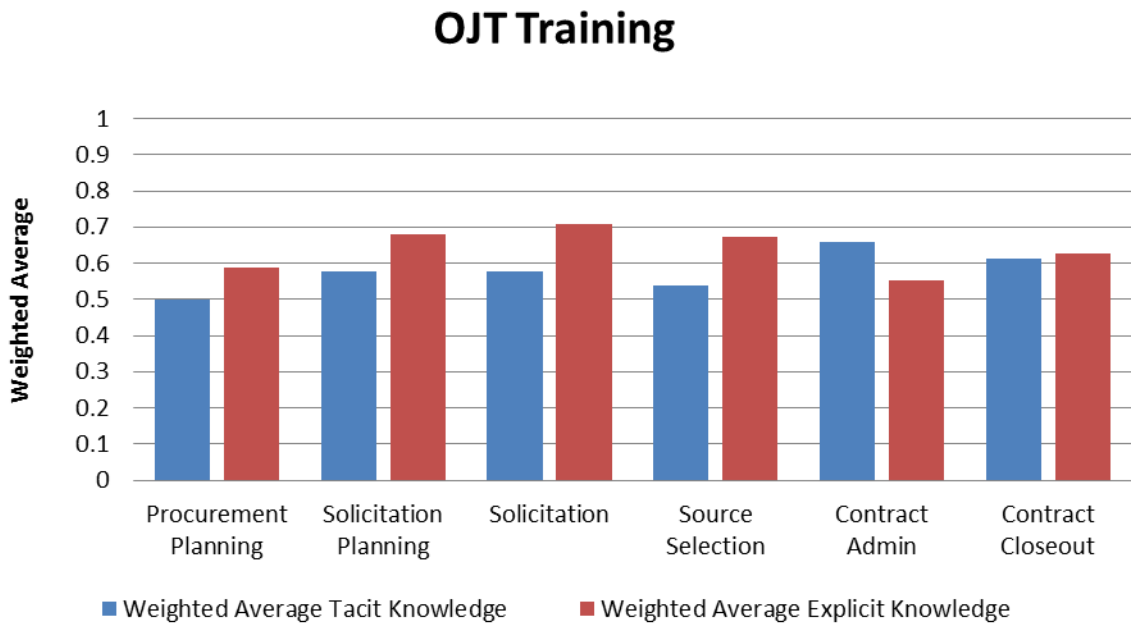


Figure 26. Respondents Preferring On-The-Job Training

Respondents preferring OJT training have higher explicit contracting knowledge levels in the procurement planning, solicitation planning, solicitation, and source selection phases. The contract closeout phase tacit knowledge and explicit knowledge were equally balanced. In the contract administration phase, the tacit knowledge exceeded explicit knowledge. Overall, OJT and the DAU preferred training methods mirror each other in five of the six phases with OJT having higher overall knowledge levels.

6. Results by Training Frequency

Figure 27 displays the number of responses categorized by the frequency of training received. Of the 139 complete responses received, 27 respondents received training weekly, 18 respondents received training twice a month, 56 respondents received training monthly, 32 respondents received training quarterly and 6 respondents chose not to answer this question. The responses for each of these training frequency categories (except for the respondents who chose not to answer this question) are presented in the subsequent sections.

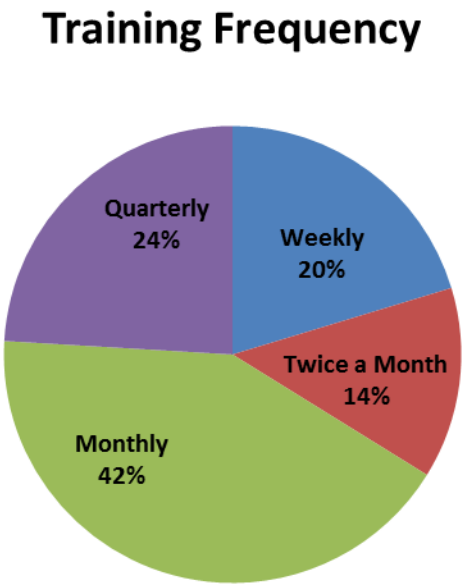


Figure 27. Responses by Training Frequency

a. Respondents by Weekly Training Frequency

There were 27 assessment respondents who identified themselves as having received training weekly. These respondents span across all areas of the demographics surveyed, such as career series and years of experience. Their results are shown in Figure 28.

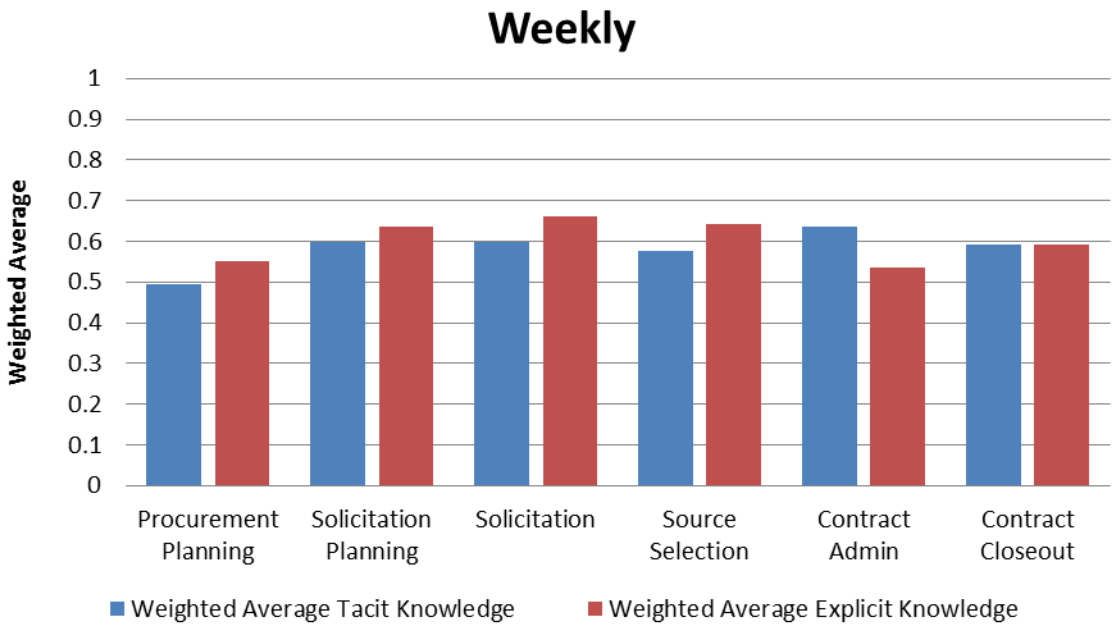


Figure 28. Respondents by Weekly Training Frequency

Respondents receiving training on a weekly basis have higher explicit contracting knowledge levels in the procurement planning, solicitation and source selection phases. In the solicitation planning and contract closeout phases, tacit knowledge and explicit knowledge were equally balanced. In the contract administration phase, the tacit knowledge exceeded explicit knowledge. Overall, explicit knowledge is equal to or exceeds tacit knowledge in five of the six phases.

b. Respondents by Twice a Month Training Frequency

There were 18 assessment respondents who identified themselves received training twice a month. These respondents span across all areas of the demographics surveyed, such as career series and years of experience. Their results are shown in Figure 29.

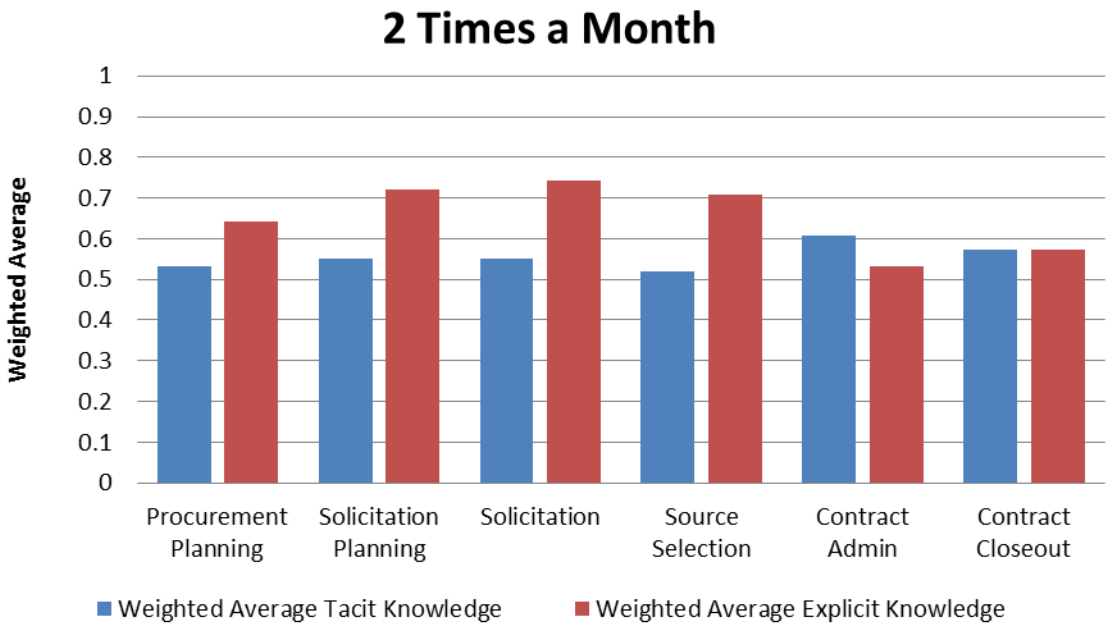


Figure 29. Respondents by Twice a Month Training Frequency

Respondents receiving training on a twice a month basis have higher explicit contracting knowledge level in the procurement planning, solicitation planning, solicitation and source selection phases. In the contract closeout phase, tacit knowledge and explicit knowledge were equally balanced. In the contract administration phase, the tacit knowledge exceeded explicit knowledge. Overall, explicit knowledge is equal to or exceeds tacit knowledge in five of the six phases and mirrors the training received weekly, however with larger gaps.

c. Respondents by Monthly Training Frequency

There were 56 assessment respondents who identified themselves as having received training monthly. These respondents span across all areas of the demographics surveyed, such as career series and years of experience. Their results are shown in Figure 30.

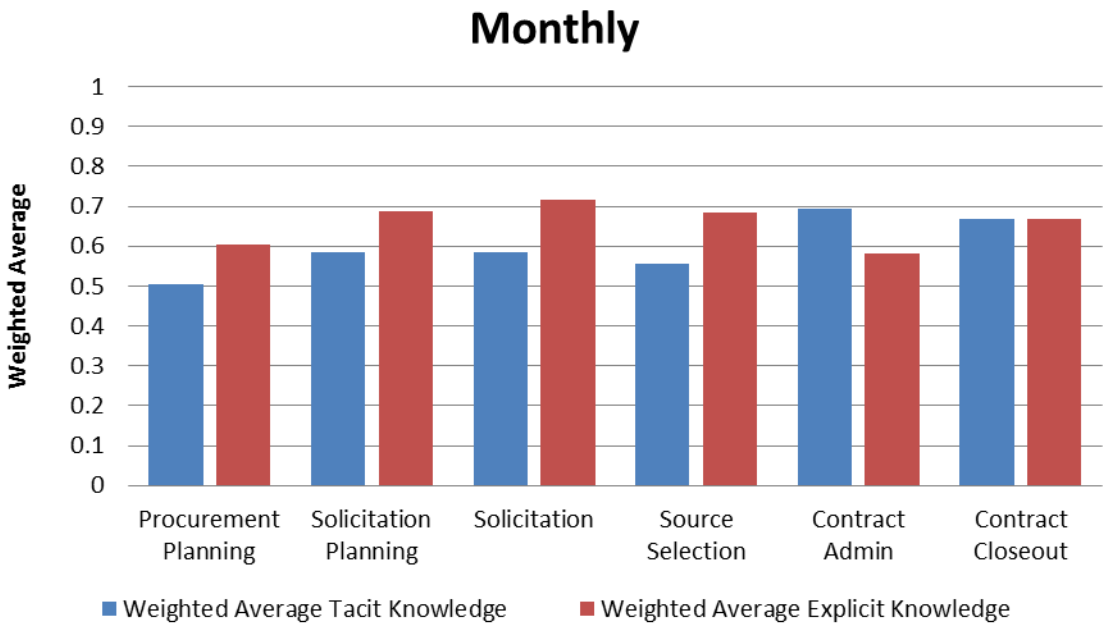


Figure 30. Respondents by Monthly Training Frequency

Respondents receiving training on a monthly basis have higher explicit contracting knowledge level in the procurement planning, solicitation planning, solicitation and source selection phases. In the contract closeout phase, tacit knowledge and explicit knowledge were equally balanced. In the contract administration phase, the tacit knowledge exceeded explicit knowledge. Overall, explicit knowledge is equal to or exceeds tacit knowledge in five of the six phases and mirrors the previously discussed training frequencies; however, the knowledge levels increases while the gaps decrease.

d. Respondents by Quarterly Training Frequency

There were 32 assessment respondents who identified themselves as having received training quarterly. These respondents span across all areas of the demographics surveyed, such as career series and years of experience. Their results are shown in Figure 31.

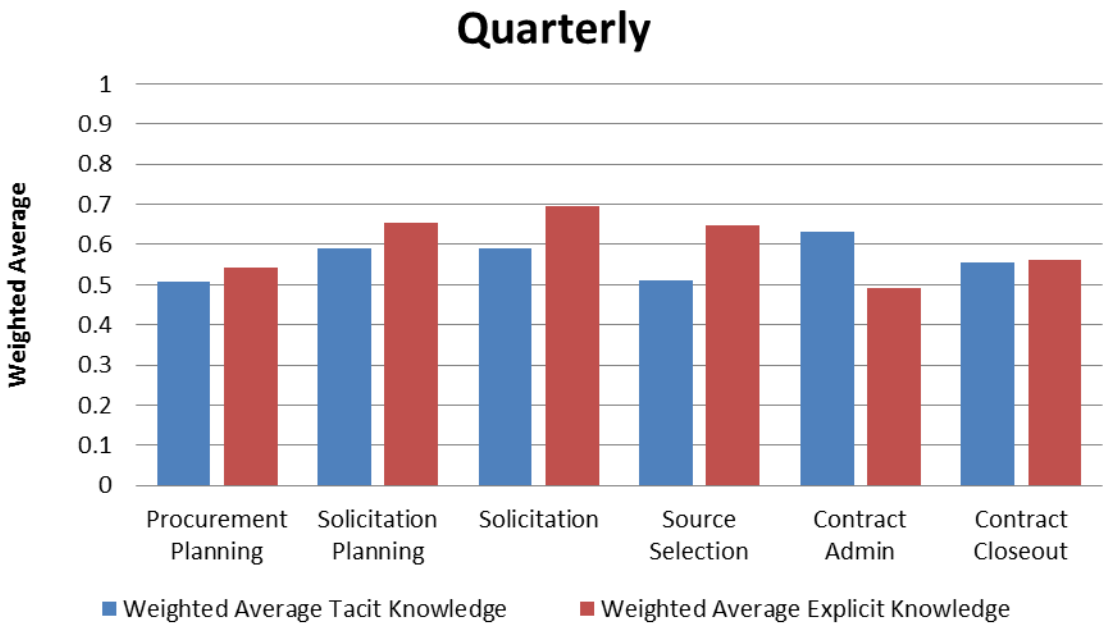


Figure 31. Respondents by Quarterly Training Frequency

Respondents receiving training on a quarterly basis have higher explicit contracting knowledge level in the procurement planning, solicitation planning, solicitation and source selection phases. In the contract closeout phase, tacit knowledge and explicit knowledge were equally balanced. In the contract administration phase, the tacit knowledge exceeded explicit knowledge. Overall, explicit knowledge is equal to or exceeds tacit knowledge in five of the six phases and mirrors the previously discussed training frequencies; however, the knowledge levels appear to decrease slightly while the gaps remain the same.

7. Overall Career Field Knowledge

Figure 32 represents the normalized tacit knowledge and explicit knowledge across the six phases of contracting for all 139 complete responses received. More specifically, the data reflects the average tacit knowledge and explicit knowledge levels across all assessment demographics and phases.

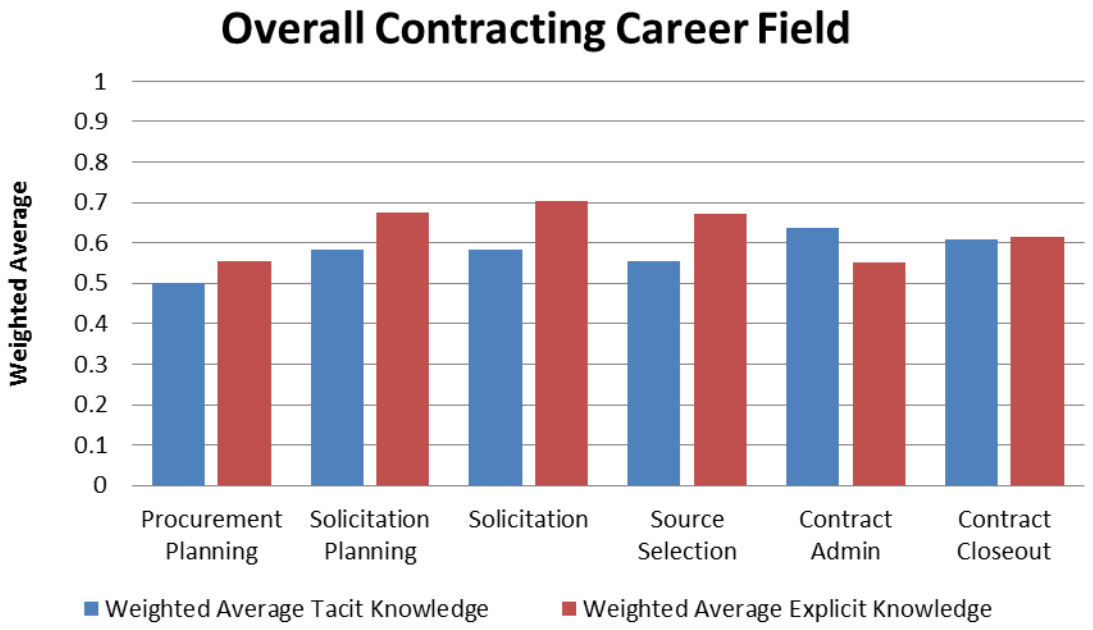


Figure 32. Overall Contracting Career Field Knowledge

In the overall data, explicit knowledge levels were higher in the procurement planning, solicitation planning, solicitation and source selection phases. In the contract closeout phase, tacit knowledge and explicit knowledge were equally balanced. The tacit knowledge exceeded explicit knowledge in the contract administration phase. Overall, explicit knowledge is equal to or exceeds tacit knowledge in five of the six contracting phases.

H. ANALYSIS

A thorough analysis of the research findings was required. A theme was revealed during the analysis based on the results of the data. The data showed contracting professionals tend to have more explicit knowledge versus tacit knowledge in the identified phases of contracting. A gap analysis was based on the assessment results for each demographic area within the MICC. The knowledge gap was identified as anything with a difference of 10 percent or greater between tacit knowledge and explicit knowledge levels for each contracting phase. Furthermore, the research team determined that if the percent gap was below zero then it represented a higher explicit knowledge

level. Conversely, if the percent of the gap was above zero there was a higher tacit knowledge level. Only the most relevant gaps shown by the assessment results were analyzed.

1. Knowledge Analysis by Career Series

A comparison was completed between the tacit knowledge and explicit knowledge levels between the different contracting professionals within the MICC. The analysis of tacit knowledge identifies some visible gaps between military and civilian personnel, while similar results were shown for the explicit knowledge comparison. Military and civilian knowledge levels are displayed in Figures 33 and 34.

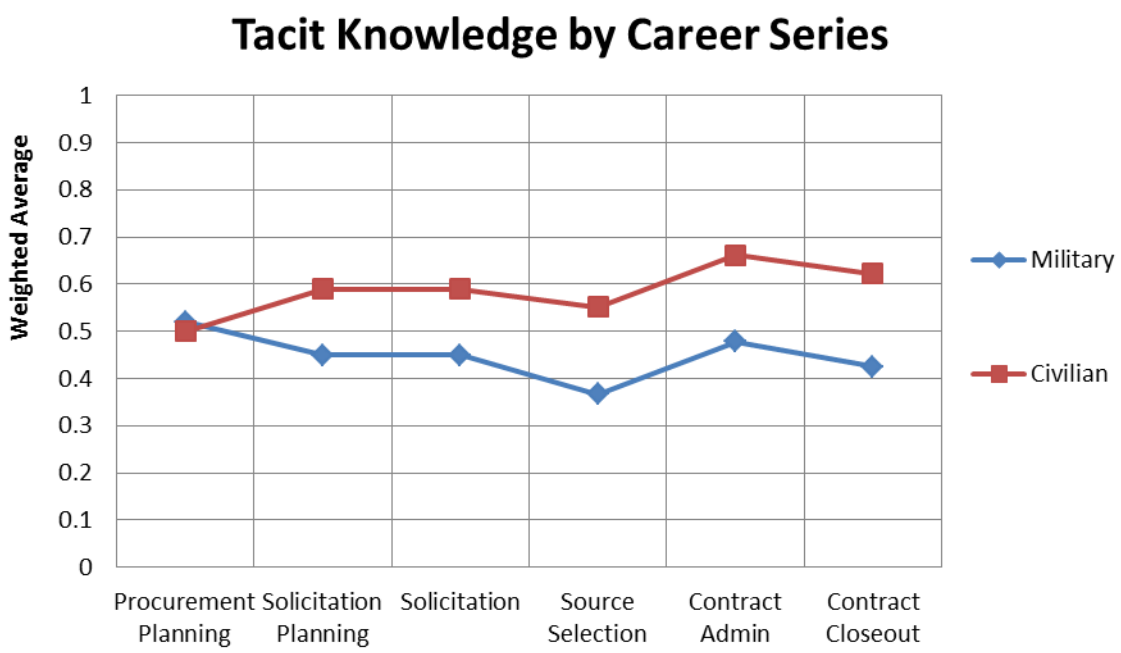


Figure 33. Tacit Knowledge by Career Series

As shown in Figure 33, civilians have more tacit knowledge than military personnel. Considering the contracting career field for the military is a fairly recent advent as a military occupation specialty (MOS), it is to be expected. In addition, military personnel have additional responsibilities requiring further training and details not contracting related, (i.e., weapons training deployment preparation, etc). Civilian

personnel tend to maintain the continuity of the contracting career field by staying with the same contracting organization for an extended time-period.

Despite the previous discussions, Figure 33 points toward a comparable pattern. Both military and civilian personnel's tacit knowledge appear to have a relative corresponding change for each contracting phase, with the exclusion of the procurement planning phase which is identical. The weighted average was the highest for both categories in the contract administration phase.

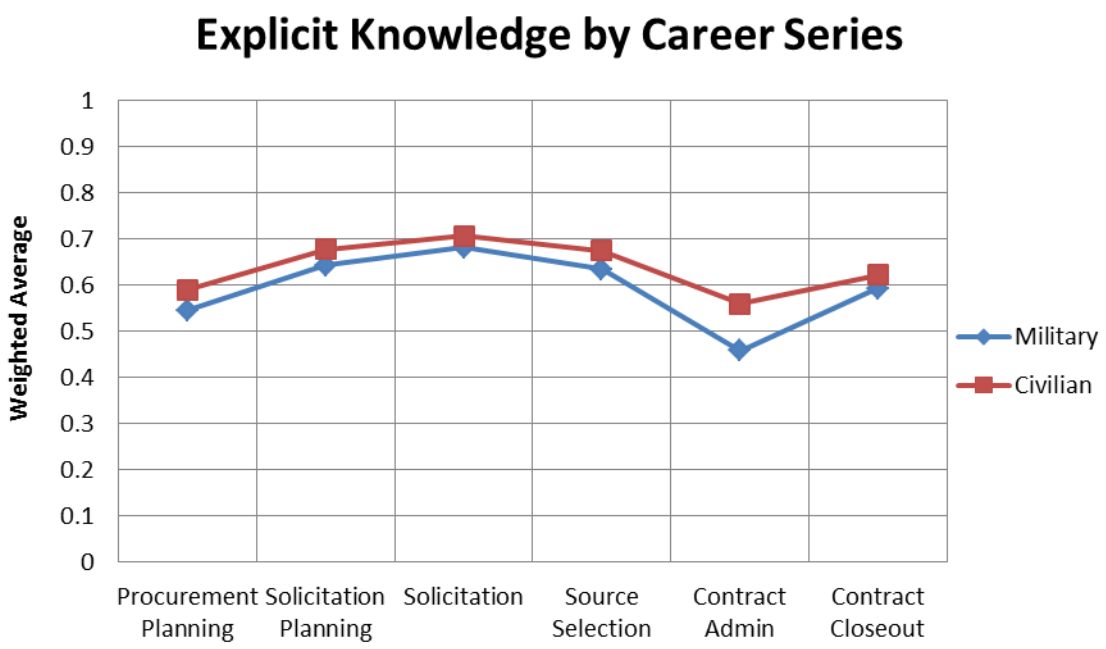


Figure 34. Explicit Knowledge by Career Series

As shown in Figure 34, the weighted averages in explicit knowledge of military and civilian are similar in five of the six contracting phases. In the contract administration phase, both military and civilians reach their lowest point. In addition, this is the largest difference between the military and civilians. There appears not to be much of a difference between the explicit knowledge involving either military or civilian. This could be attributed to the fact of everyone requiring the same level of training regardless of career series.

As depicted in Figure 33 and 34, in comparison to tacit knowledge, explicit knowledge is opposite in the contract administration phase where tacit knowledge level is higher versus the explicit knowledge level being the lowest point. The difference overall between the tacit knowledge and explicit knowledge has decreased for both the civilian and military personnel. Overall, civilians have higher tacit knowledge and explicit knowledge levels then the military personnel.

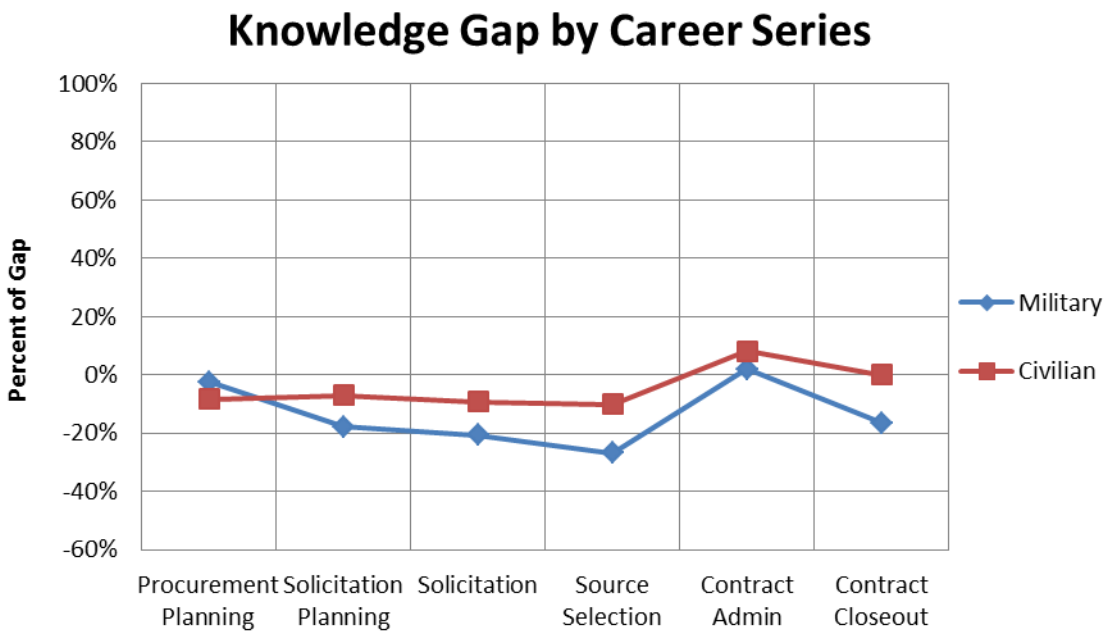


Figure 35. Size of Knowledge Gap by Career Series

Figure 35 represents the gap between tacit knowledge and explicit knowledge for the two career series. As addressed above, if the gap is above zero it represents a higher tacit knowledge level, whereas if below zero it represents a higher explicit knowledge level. The civilians' knowledge gap all remain below the 10 percent marker within all phases of contracting. However, the military show a significant gap on four out of the six phases with the source selection phase being the largest notable gap identifying higher explicit knowledge than tacit knowledge. Compared to the military, civilians appear to have a higher tacit level in most contracting phases except for the procurement planning phase, and this could be attributed to the continuity of the civilian workforce.

2. Knowledge Analysis by DAWIA Certification

A comparison was completed between the tacit knowledge and explicit knowledge levels between the different types of DAWIA contracting certification within the MICC. Tacit knowledge identifies some significant gaps between the DAWIA contracting certifications, while similar results were shown for the explicit knowledge comparison. DAWIA contracting certification levels are displayed in Figures 36 and 37.

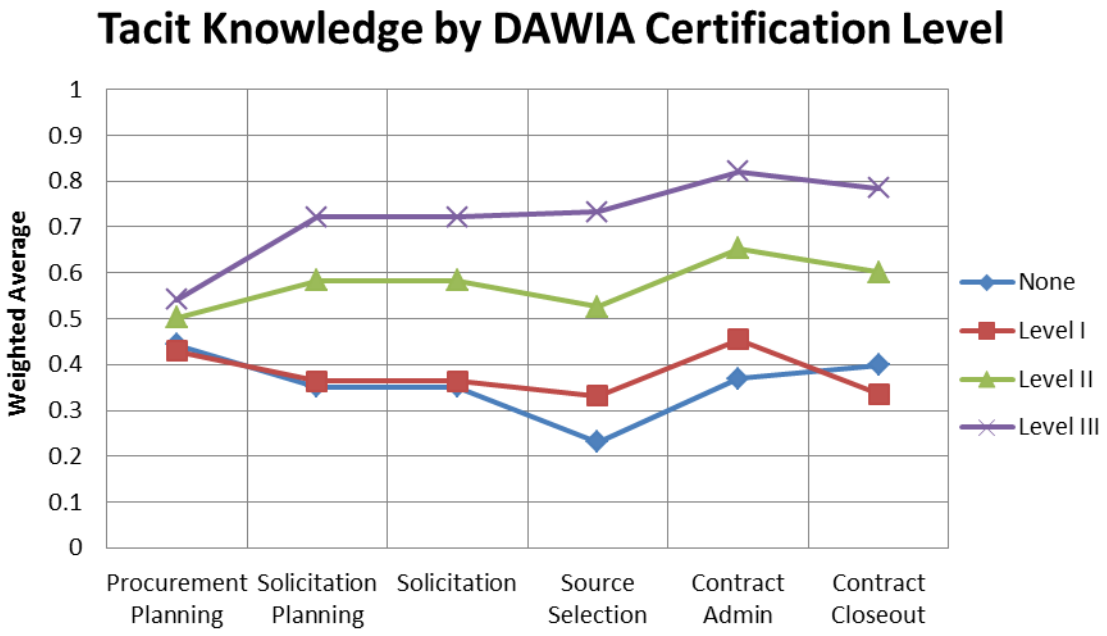


Figure 36. Tacit Knowledge by DAWIA Certification Level

The results reflected in Figure 36 reflect the tacit knowledge in the DAWIA certification level progression. Interestingly enough the progression between the DAWIA level certifications mirror each other with tacit knowledge increasing as the level of certification increases. The only real difference is those individuals with no certification level increased in their tacit knowledge in the contract closeout phase. This may be attributed to the fact new hires are often trained and tasked to complete contract closeouts until the organization is able to train them in other areas of contracting.

In addition, Figure 36 shows the procurement planning phase tacit knowledge as being in the same range regardless of the DAWIA level certification. However when comparing the source selection phase, tacit knowledge with the exception of DAWIA Level III certification there appear to be a drop in the tacit knowledge level. On the other hand, all of the DAWIA level certifications increase in their tacit knowledge level involving the contract administration phase.

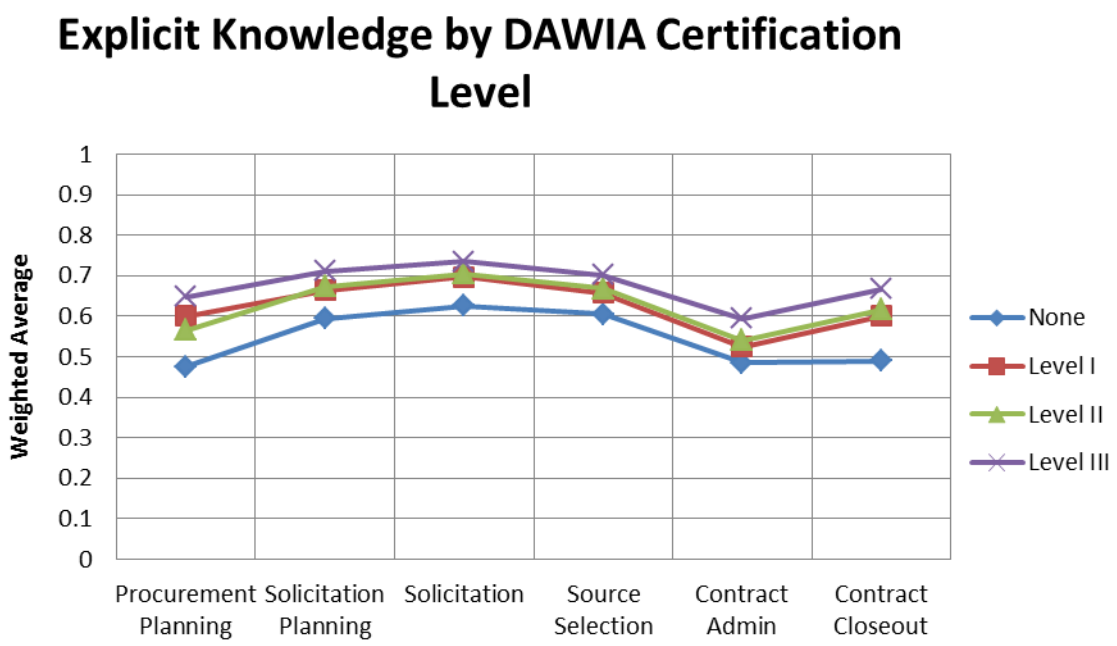


Figure 37. Explicit Knowledge by DAWIA Level

As shown in Figure 37, explicit knowledge, similar to tacit knowledge, generally increases with subsequent certification levels, although not by any significant amount. Between the DAWIA Level I and II certification levels there is virtually no difference in explicit knowledge. Typically, DAWIA Level I training is required within the first year of contracting and DAWIA Level II is within 24 months of becoming a contract specialist. This could be contributed to DAWIA Level I courses are the foundation of contracting, whereas DAWIA Level II courses expounds on the application of contracting, but does not necessarily increase the individual's explicit knowledge. Those individuals with no certifications do show the lowest level of explicit knowledge and is

the largest variance between the DAWIA level certifications, which was anticipated. Surprisingly, there is a very small variance between the DAWIA Levels I/II and DAWIA Level III. This could be a result of DAWIA Level III courses focusing more on leadership then actual contracting knowledge.

As depicted in Figures 36 and 37, in comparison to tacit knowledge, explicit knowledge is opposite in the contract administration phase where tacit knowledge level is higher versus the explicit knowledge level being the lowest point. All levels were higher in their tacit knowledge while in actuality their explicit knowledge was much lower. Overall, contracting personnel tacit knowledge and explicit knowledge is what would be expected based on the certification level of the individual. What an individual thinks they know versus what they do know is consistent with their DAWIA certifications levels.

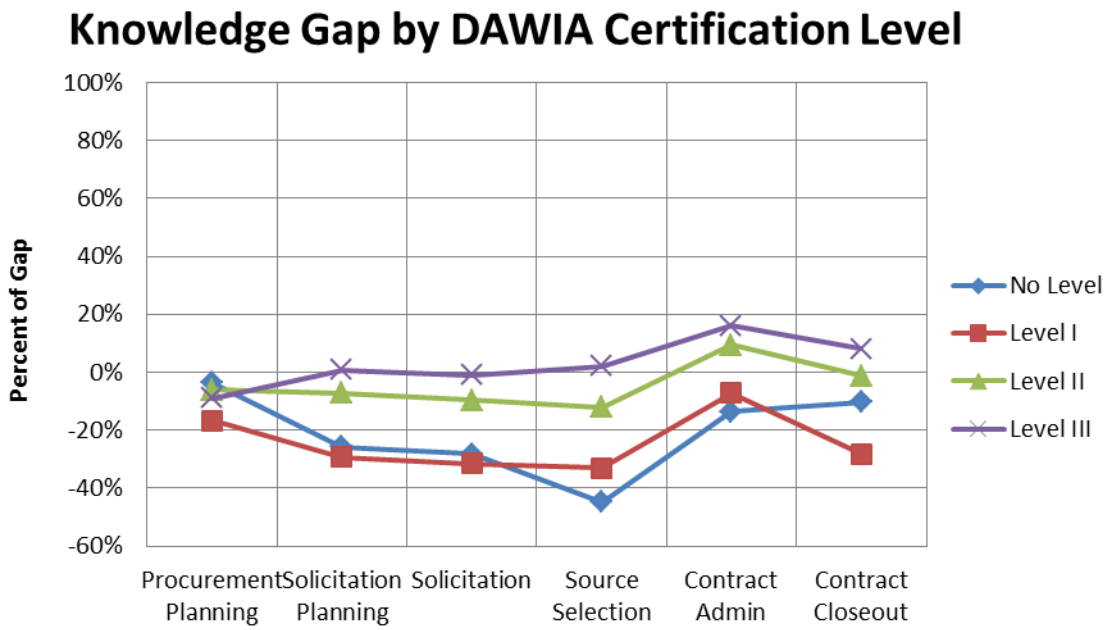


Figure 38. Size (%) of Knowledge Gap by DAWIA Certification Level

Figure 38 represents the gap between tacit knowledge and explicit knowledge for the DAWIA certification levels. As addressed above, if the gap is above zero it represents a higher tacit knowledge level, whereas if below zero it represents a higher explicit knowledge level. Those with a DAWIA Level III certifications all remain below the 10

percent marker within most of the phases of contracting, except for the contract administration phase showing the largest notable gap identifying higher tacit knowledge than explicit knowledge. The gaps between tacit knowledge and explicit knowledge are consistent with the explicit knowledge level increasing with the certification level. The source selection phase was the only phase showing a slight gap for DAWIA Level II certification identifying higher explicit knowledge than tacit knowledge when compared to the other phases. However DAWIA Level I certification shows a significant gap on five out of the six phases with the procurement planning phase having the smallest gap; the solicitation planning, solicitation, source selection and contract closeout phases have larger gaps, but comparable with each other. Those with no certification show a significant gap on four out of the six phases with the source selection phase being the largest notable gap; the solicitation planning, solicitation and contract administration phases were the other phases above the 10 percent marker. Overall, tacit knowledge and explicit knowledge increases with the progressing DAWIA certification levels.

3. Knowledge Analysis by Years of Experience

A comparison was completed between the tacit knowledge and explicit knowledge levels between the years of experience in contracting within the MICC. Tacit knowledge identifies some significant gaps between the years of experience, while similar results were shown for some phases when comparing explicit knowledge. The years of experience are displayed in Figures 39 and 40.

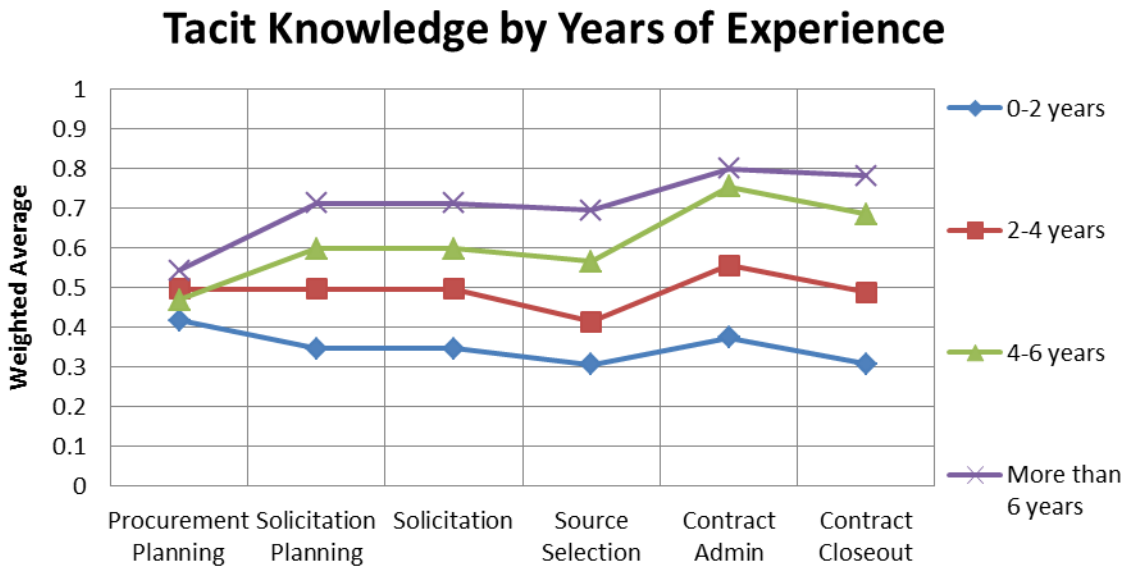


Figure 39. Tacit Knowledge by Years of Experience

The results of Figure 39 reflect what the research team anticipated seeing for the tacit knowledge based on the respondents' years of experience. The procurement planning phase is tightly grouped together with no significant variances regardless of years of experience. The solicitation planning and solicitation phases show a similar increase in tacit knowledge when comparing two to four years, four to six years, and more than six-years of experience, while there is a much larger gap between the zero to two and the two to four years of experience. The tacit knowledge for the source selection phase across all the years of experience shows the gaps between each category are relatively consistent. The contract administration phase tacit knowledge spikes upward regardless of years of experience, however the gaps identified are significant between the first three categories (starting at zero to two years and ending at four to six years of experience). Similarly, a spike occurs as a decrease in the tacit knowledge in the contract closeout phase. Overall, the tacit knowledge level increase is consistent with what would be anticipated as the number of years in contracting increases.

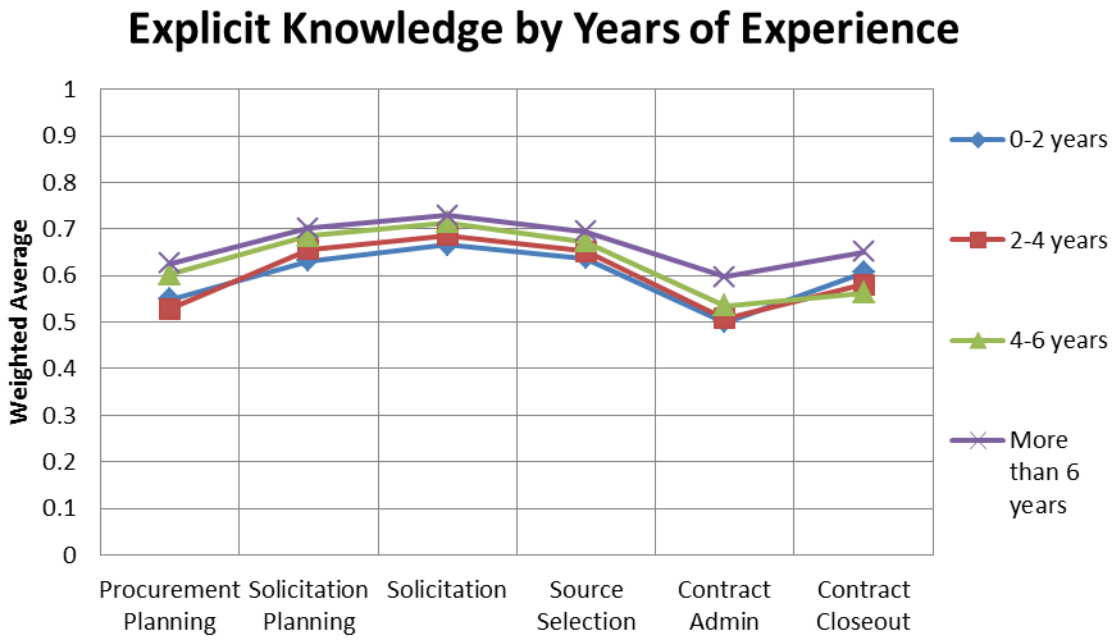


Figure 40. Explicit Knowledge by Years of Experience

Figure 40 shows the explicit knowledge by years of experience is essentially the same as the results shown in both the DAWIA level certifications and career series analyses. Further, when comparing DAWIA level certifications and number of years of experience as progression is made the explicit knowledge increases. In the areas of contract administration and contract closeout phases, there is virtually no change until an individual has more than six-years of experience. Interestingly, the relationship between the DAWIA level certifications and the number of years of experience appear to correlate substantially. For instance, most contract specialists are required to obtain their DAWIA Level II training within two years, the difference in explicit knowledge between zero to two years and two to four years of experience is minimal. There is only a slight increase in explicit knowledge for the four to six years of experience in all phases, except for the contract closeout phase. However, it is still relatively close to the previous years. Once an individual has more than six-years of experience one can assume the amount of complexity increases, thus the increased in explicit knowledge throughout all the contract phases.

As depicted in Figures 39 and 40, in comparison to tacit knowledge, explicit knowledge is opposite in the contract administration phase where tacit knowledge level is higher versus the explicit knowledge level being the lowest point. All levels had higher weighted averages in their tacit knowledge while in actuality their explicit knowledge was much lower. Overall, contracting personnel's tacit knowledge and explicit knowledge is what would be expected based on the number of years of experience of the individual. What an individual thinks they know versus what they actually know is consistent with their number of years of experience.

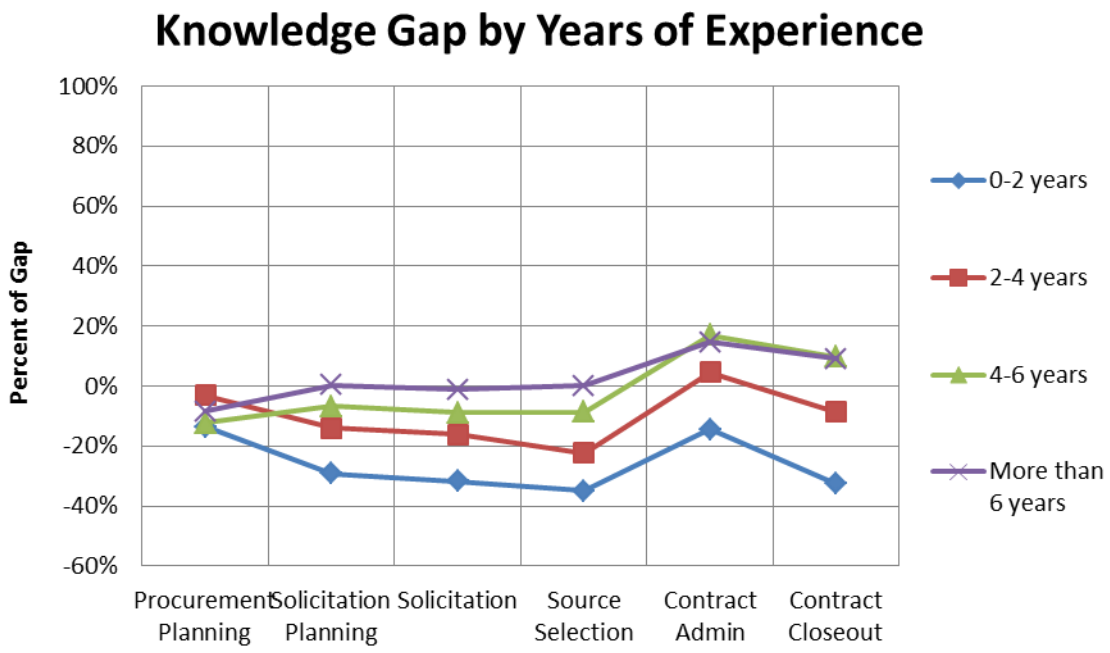


Figure 41. Size of Knowledge Gap by Years of Experience

Figure 41 represents the gap between tacit knowledge and explicit knowledge for the differing years of experience. As addressed above, if the gap is above zero it represents a higher tacit knowledge level, whereas if below zero it represents a higher explicit knowledge level. The four to six years and more than six-years of experience all remain below the 10 percent marker in all but one phase of contracting. The contract administration phase shows the largest notable gap identifying higher tacit knowledge than explicit knowledge. The gaps between tacit knowledge and explicit knowledge are

consistent with explicit knowledge level increasing as the number of years increase. The two to four years of experience shows a significant gap in explicit versus tacit knowledge for three out of the six phases, the source selection phase being the largest notable gap; the solicitation planning and solicitation phases were the other phases above the 10 percent marker. The zero to two years of experience show a gap in explicit versus tacit knowledge for all six phases with the source selection phase being the largest notable gap and the procurement planning phase being the smallest. Overall, tacit knowledge and explicit knowledge increases the longer the individual is in the career field.

Similar to the analysis completed for the previously discussed groupings, the knowledge gap in the contract administration phase continues to show a noticeable pattern. Regardless of career series, DAWIA level certification, or years of experience, the contract administration phase depicts a vast disparity between the tacit knowledge and explicit knowledge. This pattern reflects the results of the Gansler report where there were deficiencies identified in contract administration for the Army, yet there is little guidance in the FAR or at DAU to assist in alleviating the gap (Gansler, 2007).

4. Knowledge Analysis by Warrant Level

A comparison was completed between the tacit knowledge and explicit knowledge levels between the different types of warrant levels within the MICC. Tacit knowledge identifies some significant gaps between the warrant levels, while differing results were shown for the explicit knowledge comparison. Warrant levels are displayed in Figures 42 and 43.

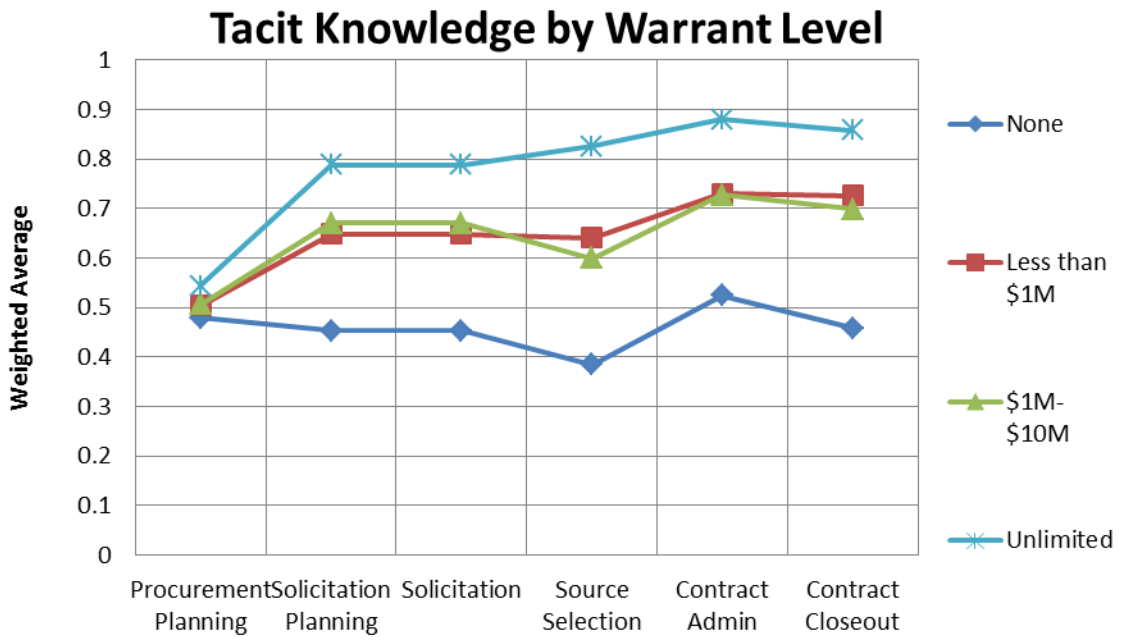


Figure 42. Tacit Knowledge by Warrant Level

The results of Figure 42 reflect what the research team anticipated seeing for the tacit knowledge based on the warrant levels held by the respondents. The procurement planning phase is tightly grouped together with no significant variances regardless of the warrant level. There was little difference in the remaining five phases, for the warrant levels of less than $1M and the warrant level between $1M and $10M. There is a larger disparity in the five phases between the limited warrant levels and those with no warrant, while the disparity between the limited warrant levels and the unlimited warrant level is smaller. The tacit knowledge for the source selection phase for those with no warrant and the limited warrant levels shows a decrease, indicating a lack of confidence in their knowledge in this phase. In the contract administration phase tacit knowledge spikes upward regardless of warrant level. Similarly, there is a spike that decreases in the tacit knowledge involving the contract closeout phase. Overall, the tacit knowledge level increases as warrant levels increase, which is consistent with what was anticipated.

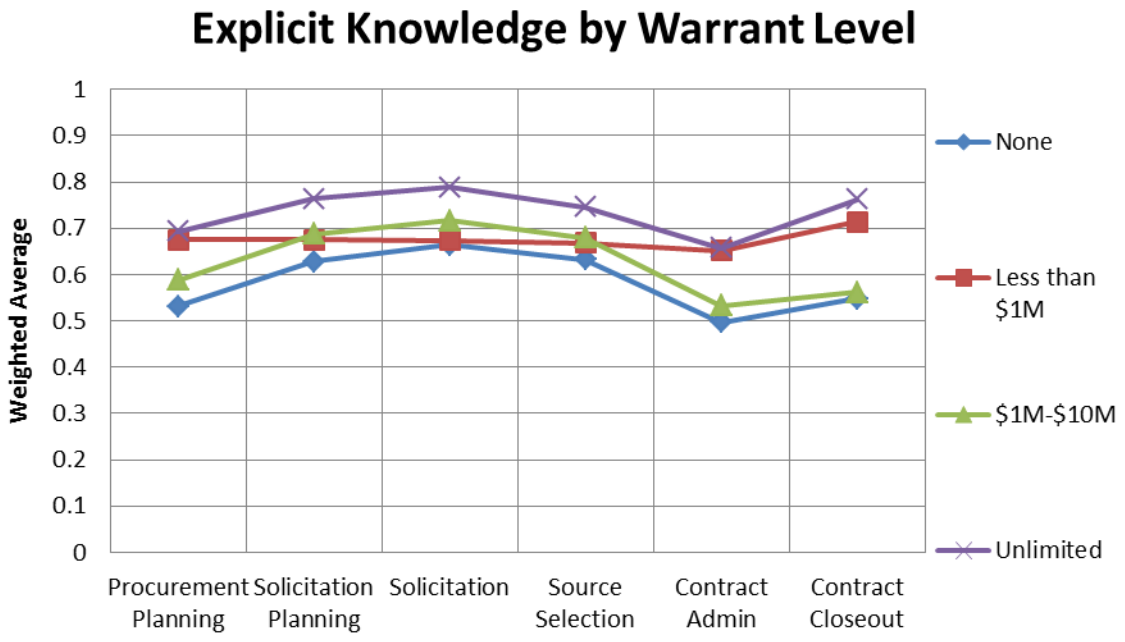


Figure 43. Explicit Knowledge by Warrant Level

Figure 43 shows the explicit knowledge for warrant levels are essentially the same as the results shown in years of experience, DAWIA level certification and career series analyses. Furthermore, when comparing the DAWIA level certification and number of years of experience as progression is made the explicit knowledge increases. Interestingly, those with a warrant level of less than $1M had very little variance in weighted averages across all phases with only a slight increase in the contract closeout phase, while the other categories weighted averages mirrored each other and varied between the different phases. In the areas of contract administration and contract closeout, those with a warrant level less than $1M and the unlimited warrant level are grouped with little difference; the same occurs for those with no warrant and the warrant level between $1M and $10M.

As depicted in Figures 42 and 43, in comparison to tacit knowledge, explicit knowledge is opposite in the contract administration phase where tacit knowledge level is higher versus the explicit knowledge level being the lowest point. All levels felt more comfortable in their tacit knowledge while in actuality their explicit knowledge was much lower. Overall, contracting personnel's tacit knowledge and explicit knowledge is what

would be expected based on the warrant level of the individual. What individuals think they know versus what they do know is consistent with their warrant level.

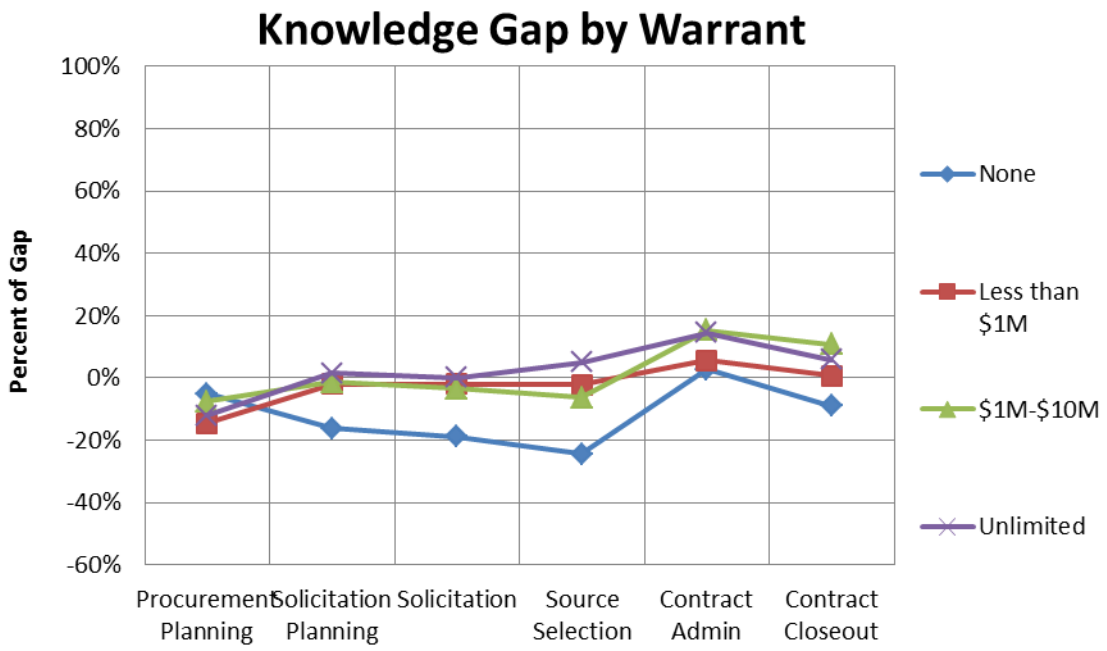


Figure 44. Size of Knowledge Gap by Warrant

Figure 44 represents the gap between tacit knowledge and explicit knowledge for the different warrant levels. As shown above, if the gap is above zero it represents a higher tacit knowledge level, whereas if below zero it represents a higher explicit knowledge level. The individuals with no warrant showed higher explicit knowledge in the solicitation planning, solicitation and source selection phases. The two limited warrants, along with the unlimited warrants, are grouped fairly close together in most phases remaining below the 10 percent marker with the exception of warrant level of less than $lM which has a higher explicit knowledge in the procurement planning phase. While between $1M–$10M warrant level has less explicit knowledge in the contract administration phase, the contract closeout phase is just above 10 percent with tacit knowledge being higher. The unlimited warrant level has more explicit knowledge in the

procurement planning phase, and more tacit knowledge in the contract administration phase. Overall, tacit knowledge and explicit knowledge increases as warrant amounts increases.

Similar to the analysis completed for the previously discussed groupings, the knowledge gap in the contract administration phase continues to be a notable pattern. Regardless of career series, DAWIA certification, years of experience, or warrant level the contract administration phase depicts a vast disparity between the tacit knowledge and explicit knowledge. This pattern reflects the results of the Gansler report where there were deficiencies identified in contract administration for the Army, yet there is little guidance in the FAR or at DAU to assist in alleviating the gap (Gansler, 2007).

5. Knowledge Analysis by Preferred Training Method

A comparison was completed between the tacit knowledge and explicit knowledge levels between the preferred training methods in contracting within the MICC. Tacit knowledge identifies some significant gaps between the preferred training methods, while similar results were shown for some phases when comparing explicit knowledge. The preferred training methods are displayed in Figures 45 and 46.

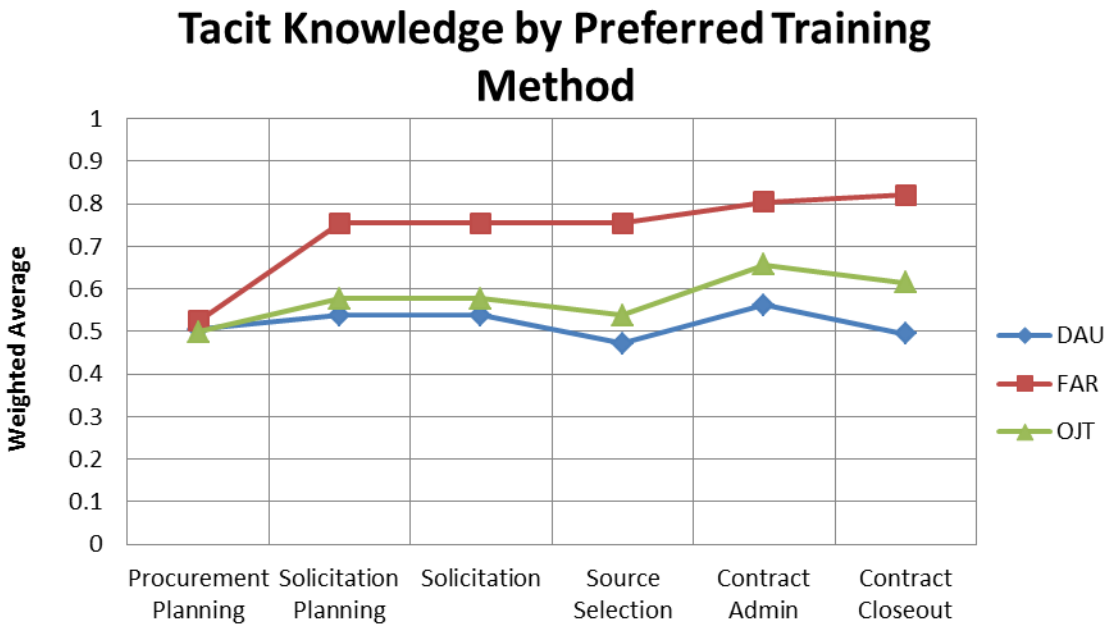


Figure 45. Tacit Knowledge by Preferred Training Method

The results of Figure 45 reflect the tacit knowledge based on preferred method of training for the respondents. For all categories regardless of the preferred training method, there was no difference in procurement planning. Those whose preferred methods of training were through DAU and OJT are closely grouped together with no significant variances in the solicitation planning, solicitation and the source selection phases. Furthermore, for these two categories the contract administration and contract closeout phases have a slight variance, with the contract closeout phase being the largest. The tacit knowledge for those whose preferred method of training was the FAR spiked notably and then remained consistent for all phases. In the contract administration phase, tacit knowledge spikes upward regardless of preferred method of training. Overall, the tacit knowledge level for those preferring FAR training is very high, while the tacit knowledge for those whose preferred methods of training was DAU and OJT were lower.

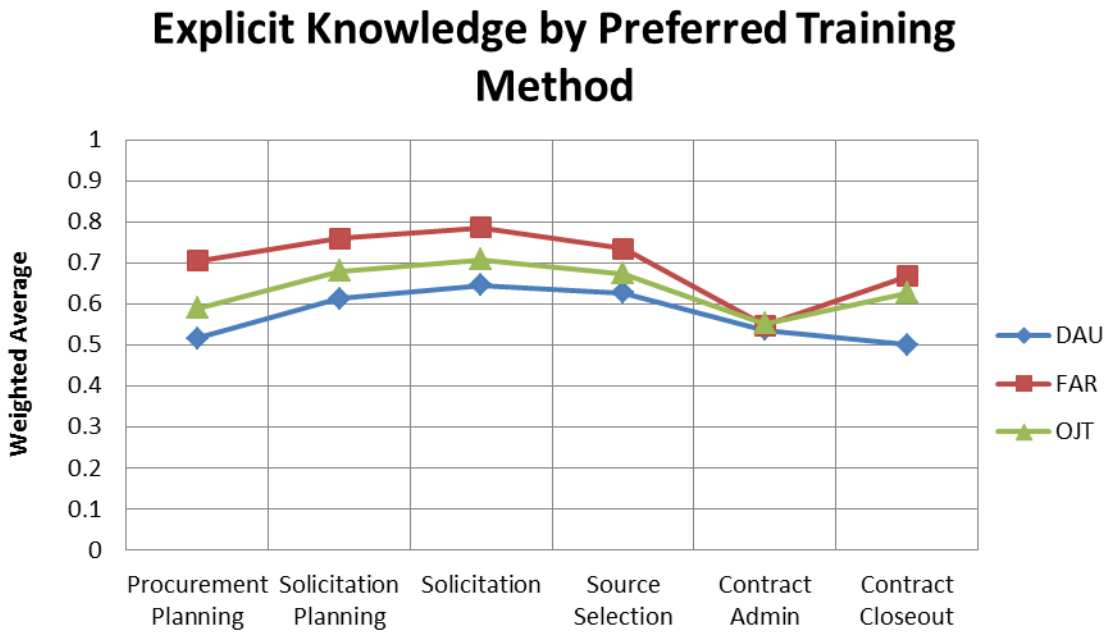


Figure 46. Explicit Knowledge by Preferred Training Method

Figure 46 shows the explicit knowledge by the preferred method of training is essentially the same as the results shown in DAWIA level certification, career series, years of experience and warrant level analyses. In the contract administration phase, there was no difference across the preferred training methods. The remaining phases showed the all preferred methods of training were closely group together with the largest difference being in the procurement planning phase between the preferred methods of training of DAU and the FAR.

As depicted in Figures 45 and 46, in comparison to tacit knowledge, explicit knowledge is opposite in the contract administration phase where tacit knowledge level is higher versus the explicit knowledge level being the lowest point. Overall, those whose preferred method of training was DAU have lower explicit knowledge than those whose preferred methods of training were less formally structured. Figure 47 represents the gap between tacit knowledge and explicit knowledge for different preferred methods of training.

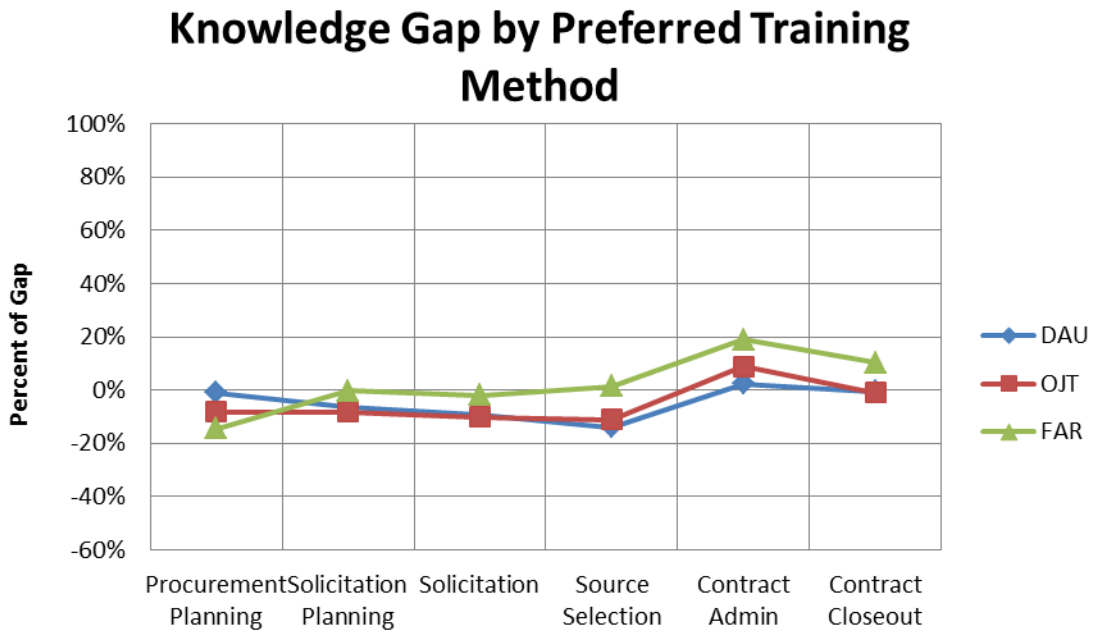


Figure 47. Size (%) of Knowledge Gap by Preferred Training Method

As addressed above, if the gap is above zero it represents a higher tacit knowledge level, whereas if below zero it represents a higher explicit knowledge level. Most of the categories remain below the 10 percent marker with a few notable exceptions in some of the phases of contracting. Those whose preferred method of training was the FAR had slightly more explicit knowledge in the procurement planning phase while more tacit knowledge in the contract administration phase. Both the DAU and OJT preferred method of training respondents had slightly more explicit knowledge in the source selection phase. Overall, tacit knowledge and explicit knowledge were consistent across the board regardless of the preferred method of training except for the procurement planning phase.

Unlike the analysis completed for the previously discussed groupings, the knowledge gap in the contract administration phase is only a notable issue for those respondents whose preferred training method is the FAR. The FAR training method depicts a vast disparity between the tacit knowledge and explicit knowledge. This pattern reflects the results of the Gansler report where there were deficiencies identified in

contract administration for the Army, yet there is little guidance in the FAR or at DAU to assist in alleviating the gap (Gansler, 2007).

6. Knowledge Analysis by Preferred Training Frequency

A comparison was completed between the tacit knowledge and explicit knowledge levels between the preferred training frequencies in contracting within the MICC. Tacit knowledge identifies some significant gaps between the preferred training frequencies, while similar results were shown for some phases when comparing explicit knowledge. The preferred training frequency is displayed in Figures 48 and 49.

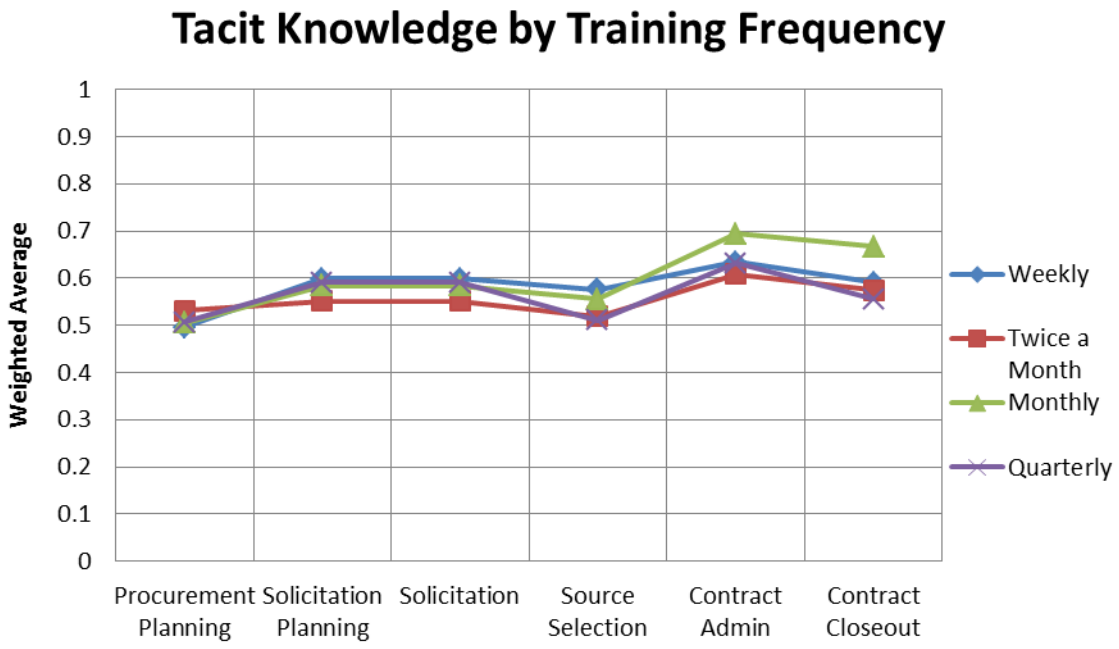


Figure 48. Tacit Knowledge by Training Frequency

The results of Figure 48 reflect what the research team anticipated seeing for the tacit knowledge based on the preferred training frequency of respondents. All of the categories of preferred training frequencies were very closely grouped together with two notable exceptions: those who preferred training frequency was monthly had higher tacit knowledge in the contract administration and contract closeout phases. overall, the tacit knowledge level was consistent across the board.

Figure 49 shows the explicit knowledge by preferred training frequency was essentially the same as the results shown in DAWIA level certification, career series, years of experience, warrant level analyses, and preferred method of training. Each of the contracting phases showed all preferred training frequencies grouped closely together in explicit knowledge.

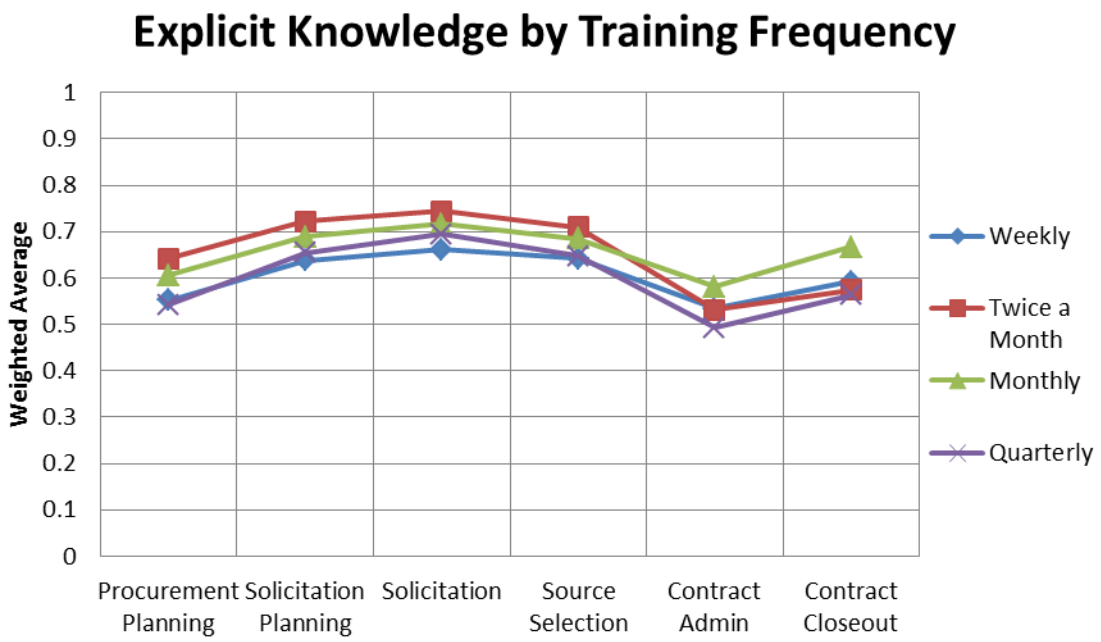


Figure 49. Explicit Knowledge by Training Frequency

As depicted in Figures 48 and 49, in comparison to tacit knowledge, explicit knowledge is opposite in the contract administration phase where tacit knowledge level is higher versus the explicit knowledge level being the lowest point. All training frequencies were higher in their tacit knowledge while in actuality their explicit knowledge was much lower. Overall, contracting personnel's tacit knowledge and explicit knowledge is what would be expected based on the training frequency. What an individual thinks they know versus what they actually know is consistent with their preferred training frequency.

Figure 50 represents the gap between tacit knowledge and explicit knowledge for different preferred methods of training. As addressed above, if the gap is above zero it

represents a higher tacit knowledge level, whereas if below zero it represents a higher explicit knowledge level. Most of the categories remain below the 10 percent marker with a few notable exceptions in some of the phases of contracting. Those who have a preferred training frequency of twice a month had slightly more explicit knowledge in the solicitation planning, solicitation and the source selection phases. Those whose preferred training frequency was monthly was right at the 10 percent marker showing more explicit knowledge in the solicitation planning and solicitation phases. Finally, the preferred training frequency respondents in the quarterly category had slightly more explicit knowledge in the source selection phase. Overall, tacit knowledge and explicit knowledge were consistent across the board regardless of the preferred training frequency.

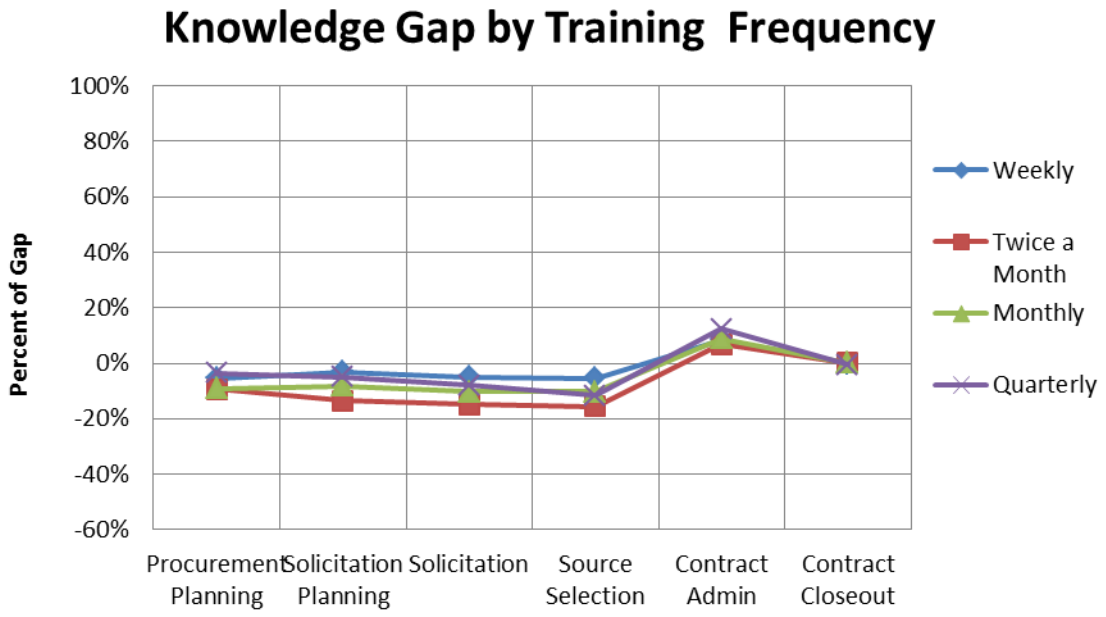


Figure 50. Size (%) of Knowledge Gap by Training Frequency

Similar to the analysis completed for the previously discussed groupings, the knowledge gap in the contract administration phase continues to be a notable pattern. Regardless of career series, DAWIA level certification, years of experience, warrant level or preferred training frequency, the contract administration phase depicts a disparity

between the tacit knowledge and explicit knowledge. This pattern reflects the results of the Gansler report where there were deficiencies identified in contract administration for the Army, yet there is little guidance in the FAR or at DAU to assist in alleviating the gap (Gansler, 2007).

7. Knowledge Analysis for the Overall Career Field

When combined, the assessment results clearly show distinct knowledge gaps across the six contracting phases. Figure 51 reveals the five distinct gaps. The first four gaps seen were where explicit knowledge exceeded tacit knowledge in the procurement planning, solicitation planning, solicitation, and source selection phases. The fifth gap was realized in the contract administration phase, where the opposite held true and tacit knowledge exceeded explicit knowledge.

We propose two possible reasons for the increased explicit knowledge gap. One reason could be due to the initial focus on training. A contract specialist has the requirement of completing their DAWIA Level II certification training within the first 24-months of employment. The second reason, until the individual has more experience, the complex requirements would not be assigned due to the high visibility of the contract. These requirements generally carry more risk and are designated for the more seasoned contracting professional. Therefore, the hands on experience would be lacking. Individuals lacking this experience would be more likely to have less comfort in admitting they are proficient in these tasks.

The fifth gap identified was in the area of the contract administration phase. Although tacit knowledge in this area is shown as higher, explicit knowledge was considered low. A possible reason for this gap is that the majority of training is geared towards planning and awarding contracts, while there is little training or regulatory guidance for the administration of the contracts after they are awarded.

Earlier within this chapter, we defined a knowledge gap as a 10 percent difference between tacit knowledge and explicit knowledge for each of the contracting phases. As shown in Figure 51, a knowledge gap exists in each of the contracting phases, with the exception of the contract closeout phase. Of the identified gaps, the solicitation phase has

the largest gap of approximately 21.01 percent, with the source selection phase closing in at 20.75 percent.

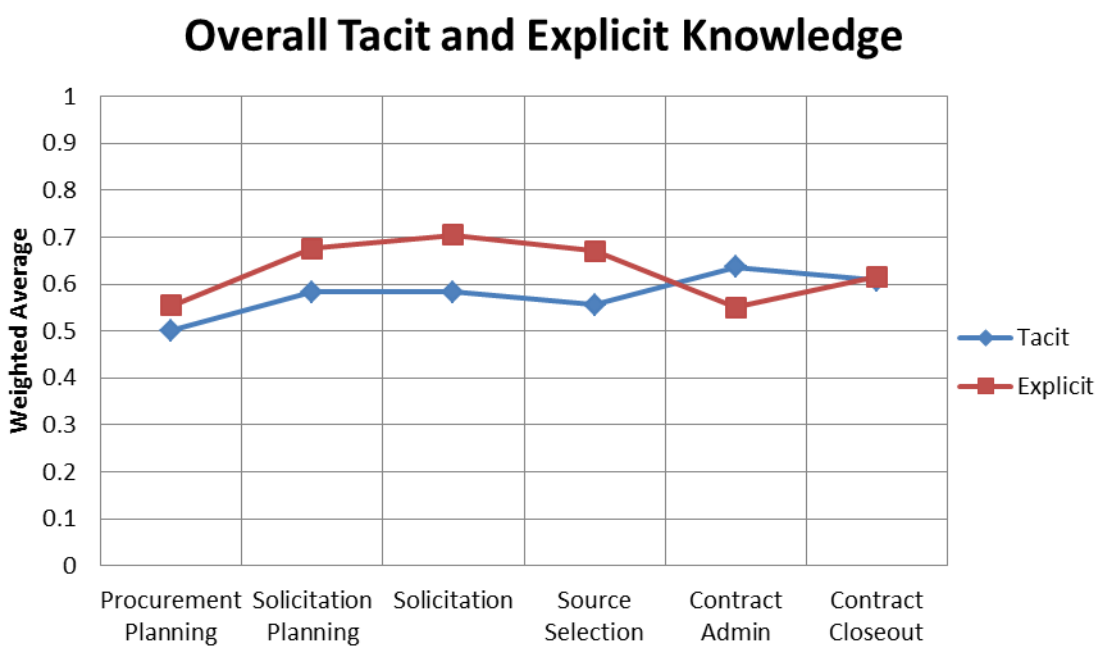


Figure 51. Overall Tacit vs. Explicit Knowledge Levels

Figure 52 shows the largest gap identified is within the contract administration phase across all demographics showing a higher tacit knowledge level then explicit knowledge. However, as depicted here there is no knowledge gap identified based on the predetermined 10 percent marker.

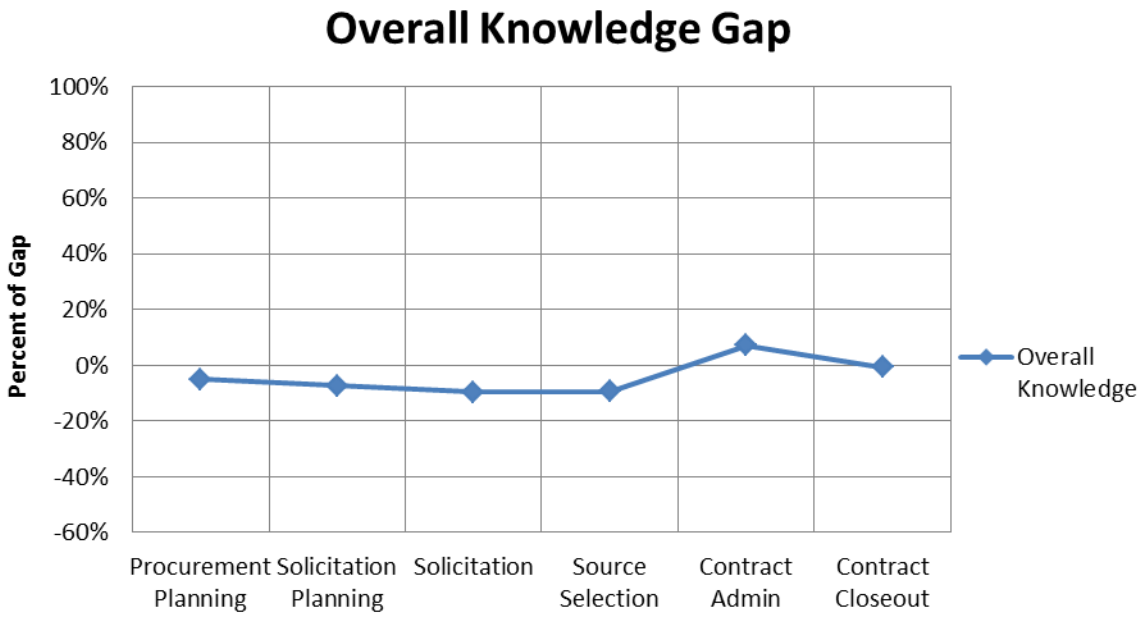


Figure 52. Overall Tacit vs. Explicit Knowledge Gap

I. SUMMARY OF FINDINGS

In this section, a summary of findings will be provided for the results in each area of research: career series, DAWIA certification level, years of experience, warrant level, preferred training method, training frequency and overall contracting career field.

1. Career Series

The military show a significant knowledge gap in four out of the six contracting phases with the source selection phase being the largest notable gap identifying higher explicit knowledge than tacit knowledge. Civilians appear to have a higher tacit knowledge level in most contracting phases except for the procurement planning phase. Both series show higher tacit knowledge levels in the contract administration phase while explicit knowledge was in fact opposite with lower explicit knowledge levels.

2. DAWIA Certification Level

The gaps between tacit knowledge and explicit knowledge are consistent with the explicit knowledge gap increasing as the certification level increases. The source

selection phase was the only phase showing a slight gap for DAWIA Level II certification, identifying higher explicit knowledge than tacit when compared to the other phases. However DAWIA Level I certification shows a significant gap in five out of the six phases. Those with no certification show a significant gap on four out of the six phases. All DAWIA certification levels show higher tacit knowledge levels in the contract administration phase while explicit knowledge was in fact opposite with lower explicit knowledge levels.

3. Years of Experience

The gaps between tacit knowledge and explicit knowledge are consistent with explicit knowledge differences increasing as the number of years increases. The two to four years of experience shows a significant gap in explicit knowledge versus tacit knowledge for three out of the six phases. The zero to two years of experience show a gap in explicit knowledge versus tacit knowledge for all six phases. All years of experience show higher tacit knowledge levels in the contract administration phase while explicit knowledge was in fact opposite with lower explicit knowledge levels.

4. Warrant Level

The gaps between tacit knowledge and explicit knowledge are consistent with explicit knowledge differences increasing as warrant levels increases. The individuals with no warrant showed higher explicit knowledge in the solicitation planning and source selection phases. The warrant level of less than $lM had a higher explicit knowledge in the procurement planning phase. The unlimited warrant level had more explicit knowledge in the procurement planning phase and more tacit knowledge in the contract administration phase. All warrant levels show higher tacit knowledge levels in the contract administration phase while explicit knowledge was in fact opposite with lower explicit knowledge levels.

5. Preferred Training Method

The gaps for tacit knowledge and explicit knowledge were consistent, except for the procurement planning phase, across the board regardless of the preferred method of

training. Those whose preferred method of training was DAU have lower explicit knowledge than those whose preferred methods of training were less formally structured. Those whose preferred method of training was the FAR had slightly more explicit knowledge in the procurement planning phase. The DAU and OJT preferred method of training respondents had slightly more explicit knowledge in the source selection phase. All of the preferred methods of training show higher tacit knowledge levels in the contract administration phase while explicit knowledge was in fact opposite with lower explicit knowledge levels.

6. Training Frequency

The gaps for tacit knowledge and explicit knowledge is what would be expected based on the training frequency. Those who have a preferred training frequency of twice a month had slightly more explicit knowledge in the solicitation planning, solicitation and the source selection phases. Those whose preferred training frequency was monthly had more explicit knowledge in the solicitation planning and the solicitation phases. The preferred training frequency respondents in the quarterly category had slightly more explicit knowledge in the source selection phase. All of the training frequencies show higher tacit knowledge levels in the contract administration phase while explicit knowledge was in fact opposite with lower explicit knowledge levels.

7. Overall Contracting Career Field

There was a knowledge gap in each of the contracting phases, with the exception of the contract closeout phase. The solicitation and source selection phases had the largest gaps. The overall contracting career field shows higher tacit knowledge levels in the contract administration phase while explicit knowledge was in fact opposite with lower explicit knowledge levels.

J. RECOMMENDATIONS

In this section, recommendations will be provided in response to the results of the research, such as implement mandatory contract administration courses in DAWIA

certifications, Develop On-the-Job Training (OJT) Program, and incorporate more contract administration procedures in regulatory guidance.

1. Implement Mandatory Contract Administration Courses in DAWIA Certification

Our research shows there is a need for additional focus on the contract administration phase. Our analysis indicates that regardless of the demographic group, contracting professionals have significantly less explicit knowledge than tacit knowledge in the contract administration phase. DAWIA already has a strong training focus on the procurement planning, solicitation planning, solicitation, and source selection phases; however appears to lack an emphasis on training in the contract administration phase. Incorporating training courses at DAU involving the contract administration phase would grab the attention of the contracting professional calling attention to the importance of this phase early in their career. In order to maintain the emphasis of importance and increase the explicit knowledge within the contract administration phase, the addition of DAU continuous learning modules will facilitate a continued knowledge growth.

2. Develop On-the-Job Training Program

In addition, our research findings recommends the implementation of an OJT program that mirrors the Air Forces AFSC 6C0X1 Contracting Career Field Education and Training Plan for enlisted, as attached in Supplemental. This plan is a comprehensive training document that establishes core task requirements and training requirements for the Air Force contracting career field. This type of program would increase every contracting professional's tacit knowledge levels, thus reducing the tacit knowledge and explicit knowledge gaps. Our research results indicate that 123 of 139 survey respondents, or 88 percent, identified OJT as their preferred method of training. Implementation of a standardized OJT program would focus on the required critical contracting skills necessary to build a solid contracting knowledge foundation.

3. Incorporate More Contract Administration Procedures in Regulatory Guidance

Finally, our research findings recommend incorporating more contract administration guidance in the contracting regulations, specifically within the DFARS, DFARS PGI and AFARS. Currently, there are only three parts within the FAR that address the contract administration phase. These parts only address an overarching perspective and do not provide any detailed "how-to" guidance. Out of the six areas the research covered, it indicated a need for increased explicit knowledge in contract administration. The addition of more detailed guidance to assist contracting personnel in the contract administration phase would increase the explicit knowledge and address the deficiencies identified in the Gansler report (Gansler, 2007)

K. SUMMARY

This chapter identified the procedures used in developing the assessment, along with the findings and analysis of the research data. First, the assessment construction was discussed, followed by the validity and contents of the assessment. From there a discussion was completed on how the selection of the sample population and data collection was done, along with the limitations of the assessment tool. Next, we presented the findings of each assessment section within the major demographic categories. Once all findings were discussed, a gap analysis was performed on each major demographic category, while discussing possible reasons for any gaps. Finally, recommendations were given based on the research completed. The following chapter will provide the summary, conclusions, and recommendations for further research.

V. SUMMARY, CONCLUSION, AND AREAS FOR FURTHER RESEARCH

A. SUMMARY

The Army has faced issues and challenges throughout the acquisition process, particularly in the contracting career field. Operational contracting support provided by the MICC to the warfighter includes everything from acquiring the necessary equipment, supplies, and services vital to the mission and overall well-being of the Army Soldiers and their families. Development of contacting personnel is important due to the ever-changing contracting rules and regulations in order to stay current with the acquisition trends. The contracting process is divided into six phases: procurement planning, solicitation planning, solicitation, source selection, contract administration and contract closeout, which requires special skills set in each phase. The contracting professional's knowledge is vital due to the complexity of the work.

A review of the literature identified that knowledge management encompasses different types of knowledge necessary for an individual to be fully functional in a given area, tacit knowledge and explicit knowledge. DAWIA establishes standards for education, training (explicit knowledge) and work experience (tacit knowledge) for DOD's acquisition workforce. Acquisition training is a requirement of DAWIA and provides the explicit knowledge through DAU course work, while tacit knowledge is provided by on-the-job training and experience. The Army contracting professional utilizes the ACTEDS Plan CP-14—Contracting and Acquisition Career Program, which shows an overview of the education, training, and experience required by DAWIA as a means to track career progression requirements. The ability to understand that the two different types of knowledge exist allows for the identification of gaps in an individual's tacit knowledge and explicit knowledge. After the identification of knowledge gaps, closing the knowledge gaps may be possible. The capability of a contracting professional is maximized through the experience and training received once the knowledge gaps are eliminated.

The objective of this research was to identify and assess tacit knowledge and explicit knowledge gaps in operational contracting, complete an analysis on the assessment results, and provide recommendations to close knowledge gaps where identified. Assessing the contracting knowledge gap can be a challenge because of the sheer magnitude of the required knowledge involved in DOD contract management. To capture the data needed to measure and analyze tacit knowledge and explicit knowledge, we used a modified survey-based knowledge assessment tool developed by Aufderheide et al. (2011) the Air Force Operational Contracting Knowledge Assessment (OCKA-AF). Permission was granted by Aufderheide et al. (2011) and their research advisor to utilize the assessment. The assessment was divided into three distinct sections; demographic questions, tacit knowledge questions, and explicit knowledge questions. The knowledge assessment's target population was the Army MICC contracting personnel performing contracting duties at all levels within the organization. The assessment was only limited by the responsiveness of the targeted population.

Following the distribution of the assessment tool, an analysis of the knowledge gap was performed on multiple demographic categories. Multiple gaps were identified from the assessment responses during the analysis of the findings. The assessment results allowed for an analysis in each of the six contracting phases, which revealed further gaps throughout the entire contracting process.

B. CONCLUSION

This research sought to address the three research questions identified in Chapter I. Utilizing the gap analysis results, three recommendations were made to potentially narrow the existing knowledge gaps.

1. Where Does the Gap Exist between Explicit and Tacit Contracting Knowledge in the Six Phases of Contracting?

Our research determined there are significant knowledge gaps between tacit knowledge and explicit knowledge involving all six phases of contracting, but the degree of the gaps vary throughout the different demographics assessed. Overall, there was a knowledge gap in each of the contracting phases, with the exception of the contract

closeout phase. The solicitation and source selection phases had the largest gaps. The overall contracting career field shows higher tacit knowledge levels in the contract administration phase while explicit knowledge was in fact opposite with lower explicit knowledge levels. Within the analysis section, the gaps between tacit knowledge and explicit knowledge in the six contracting phases were addressed, and recommendations were made on the potential methods to close those gaps.

2. What Consistencies are there in the Knowledge Gaps across the Various Demographics Surveyed?

One consistency found was within the procurement planning phase. Out of all the demographics surveyed, it showed little to no difference in their knowledge gap involving the procurement planning phase. In addition, most of the demographics surveyed showed source selection to have higher explicit knowledge versus tacit knowledge. Both of these consistencies could be attributed to the initial DAU training received, which stresses on more of the start of an acquisition and the selection of a contract awardee. However four of the demographics surveyed, DAWIA level III, Unlimited warrant, FAR method of training, and weekly training frequency, were considered to be more equal in their tacit knowledge and explicit knowledge in the source selection phase. We believe that with the more knowledge and experience an individual possesses, the tacit knowledge and explicit knowledge gap would close. This finding substantiates this observation.

Regardless of the demographics surveyed, results show a higher tacit knowledge level in the contract administration phase while explicit knowledge was in fact opposite with lower explicit knowledge levels. This finding reflects the results of the Gansler report where there were deficiencies identified within contract administration in the Army (Gansler, 2007). This finding could be due to the fact there is little emphasis in the DAU training courses or in the regulatory guidance concerning contract administration.

3. What are the Recommendations to Decrease the Identified Knowledge Gaps?

The gap analysis resulted in three recommendations made to potentially narrow the existing knowledge gaps. We recommended implementing mandatory contract administration courses in DAWIA level certifications, develop On-the-Job Training (OJT) Program, and incorporating more contract administration procedures in regulatory guidance.

Ultimately, this research successfully utilized an assessment tool allowing for the collection and analysis of research data enabling the identification of existing knowledge gaps and patterns across the multiple demographic categories, and recommendations were made to narrow these knowledge gaps. Although the assessment provided a basis for contracting knowledge within the MICC, this is only the start for which future contracting knowledge advancements can be developed.

C. AREAS FOR FURTHER RESEARCH

The research provided an understanding of the knowledge gaps between tacit knowledge and explicit knowledge. The results of the assessment identified specific gaps within the six phases of contracting across the MICC contracting workforce. Although the research team is confident in the results shown in the assessment for the sample populations' contracting knowledge, we do believe additional research is necessary to provide a more complete picture of the knowledge of personnel within government contracting. Recommended areas for further research are discussed below.

We recommend as an area of further research, the assessment be deployed to a larger population within the operational contracting workforce within ACC in order to more accurately capture the comprehensive knowledge held currently throughout the entire Army. In addition, the assessment could be expanded further to the Department of Defense (DOD) as a whole to gauge the contracting knowledge base of an even greater population. A larger population allows for a more accurate depiction of the operational contracting knowledge levels throughout the entire DOD contracting career field.

Since the research was only completed within the operational contracting workforce, we recommend further research be conducted within systems contracting. The assessment could be tailored to system contracting specific tacit knowledge and explicit knowledge questions. This could be used for a comparison to see if there are similar knowledge gaps between operational contracting and systems contracting which would allow for further development in DAU training courses tailored more specific to operational or systems contracting.

Another area of research could also be tailoring the assessment to determine if a direct correlation exists between the level of proficiency (tacit knowledge) an individual has to their confidence and comfort levels when applying their knowledge to the six phase of contracting. It is believed an individual identifying themselves as advanced in an area is based on their DAWIA certification level, years of experience or warrant level, but would their comfort level remain the same if they were actually given the task for completion. By completing more research in this area, an organization would be able to tailor their on-the-job training programs to those areas where confidence and comfort in an area is lacking.

Lastly, would there be a need to develop an assessment tool for Directors and Commanders to use for their own organizations. We believe an assessment tool gauging the knowledge base of an organization would allow for the organization to have a more focused on-the-job training program based on the needs of their personnel. Also, this information could be an aid in determining rotations for personnel within the organization. By providing a tool such as this, the assessment tool would allow for a Director or Commander to manage their organization more efficiently and effectively.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A. THE CURRENT COMPETENCY MODEL

This model is from DPAP, 2010.

11 Units of Competence: 10 Technical Units and 1 Professional Unit	**28 Technical Competencies 10 Professional Competencies**	**52 Technical Elements, 10 Professional Elements**
Pre-Award and Award	Determination of How Best to Satisfy Requirements for the Mission Area	1. Provide proactive business advice on requirements documentation based on analysis of requirements and performance-based approaches to find the best solution to satisfy mission requirements.
		2. Conduct market research using relevant resources prior to solicitation to understand the industry environment and determine availability of sources of supply and/or services.
		3. Perform acquisition planning by considering all available sources and methods of procurement to satisfy mission needs while appropriately allocating risk.
	Consider Socio-economic Requirements	4. Consider socio-economic requirements including small business, labor, environmental, foreign, and other socio-economic requirements to provide maximum practicable contracting and subcontracting opportunities.
	Promote Competition	5. Conduct pre-solicitation industry conferences and analyze responses to draft solicitation terms and conditions to promote full and open competition.
		6. Identify and facilitate joint ventures and partnering on solicitations and subcontracting opportunities to increase competition and/or small business participation.
	Source Selection Planning	7. Document a source selection plan that is consistent with public law, regulations, policy, and other guidelines.
	Solicitation of Offers	8. Conduct pre-bid or pre-proposal conference to inform offerors of the requirements of the acquisition.
		9. Publicize proposed procurements to promote competition.
		10. Issue a written solicitation consistent with the requirements documents, acquisition plan and source selection plan, that includes the appropriate provisions and clauses tailored to the requirement.
		11. Issue amendments or cancel solicitations when such actions are in the best interest of the Government and conform to law and regulations.

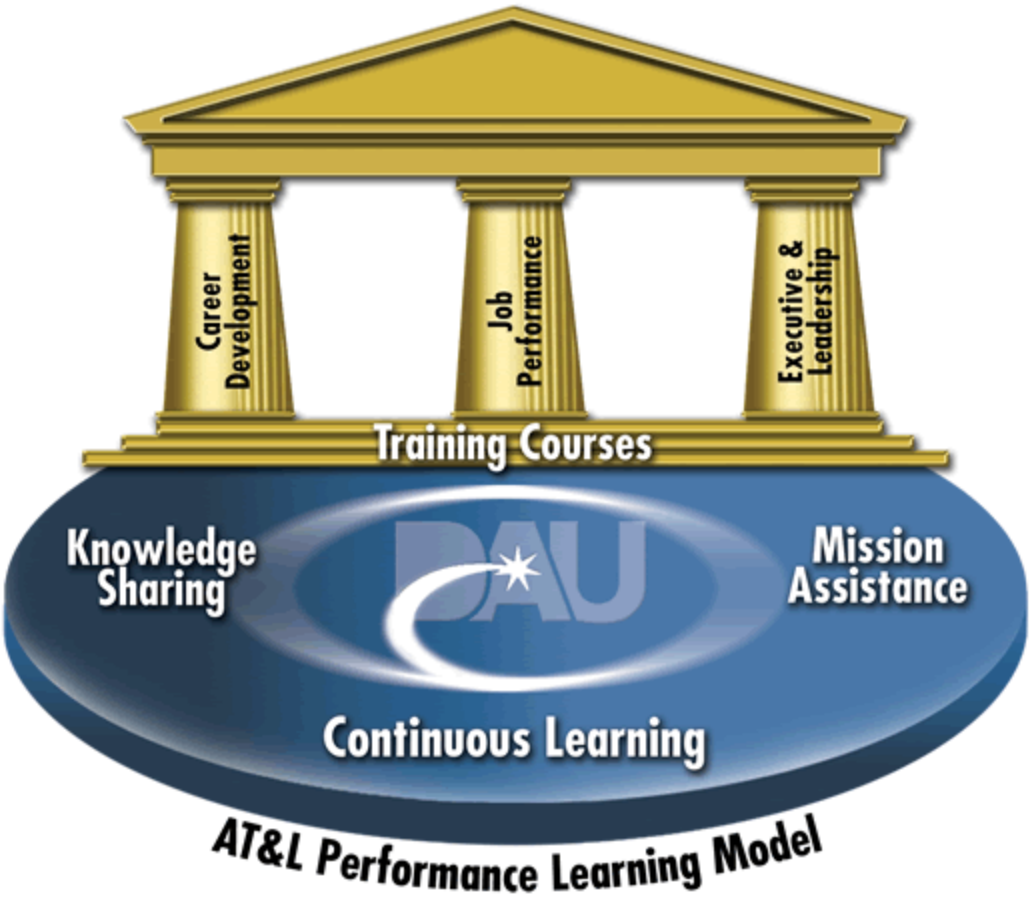
11 Units of Competence: 10 Technical Units and 1 Professional Unit	28 Technical Competencies 10 Professional Competencies	52 Technical Elements, 10 Professional Elements
		12. Respond to preaward inquiries by taking the appropriate action according to FAR/DFARS (and applicable supplements) to resolve questions.
	Responsibility Determination	13. Determine contractor responsibility by assessing past performance and financial stability to ensure that the contractor will be able to satisfy Government requirements.
	Bid Evaluation (Sealed Bidding)	14. Evaluate the sealed bids in an transparent manner to preserve the integrity of the competitive process.
		15. Perform price analysis to determine whether the lowest evaluated bid is reasonable and provides the best value to the Government.
	Proposal Evaluation (Contracting by Negotiation)	16. Evaluate proposals and quotes against evaluation criteria and request technical and pricing support, if needed, to identify offers that are acceptable or can be made acceptable.
	Source Selection	17. Decide whether to hold discussions based on results of the evaluation.
		18. Establish the competitive range to determine which of the offers will not be considered for the award.
	Contract Award	19. Select the awardee who in the Government's estimation, provides the best value.
		20. Award contract/ Issue task or delivery orders after ensuring fund availability and obtaining reviews and approvals.
		21. Conducting pre/post award debriefings for all unsuccessful offerors when requested to ensure appropriate disclosure of information.
	Process Protests	22. Process protests to determine whether to withhold award or stop performance pending outcome of the protest.
Develop and/or Negotiate Positions	Justification of Other than Full and Open	23. Justify the need to negotiate or award the contract without full and open competition or, in a multiple award scenario, without providing for fair opportunity based on business strategies and market research.
	Terms and Conditions	24. Determine terms and conditions, including special contract requirements applicable to the acquisition, that are appropriate for the acquisition to comply with laws and regulations (e.g., method of financing, Government property,

11 Units of Competence: 10 Technical Units and 1 Professional Unit	28 Technical Competencies 10 Professional Competencies	52 Technical Elements, 10 Professional Elements
		intellectual property, OCI, specialty metals).
	Preparation and Negotiation	25. Prepare for negotiations / discussions / awards by reviewing audit and technical reports, performing cost and/or price analysis (or reviewing price analysts reports), and developing pre-negotiation position to include identifying potential trade-offs.
		26. Negotiate terms and conditions (including price) based on the pre-negotiation objective and give-and-take with the offeror to establish a fair and reasonable price.
Advanced Cost and/or Price Analysis	Advanced Cost and/or Price Analysis	27. Evaluate the reasonableness of the contractor's proposed cost/price for use in preparing for complex negotiations.
		28. Develop positions on pricing-related-contract terms and conditions to aid in developing the Government's position.
		29. Supports special cost, price, and finance efforts by researching, analyzing and providing recommended positions that are in the best interests of the Government.
		30. Evaluate award fee/incentive fee plans and arrangements for adherence to policy and guidance.
Contract Administration	Initiation of Work	31. Conduct post-award orientations to address customer concerns and contractor's responsibilities for performance of the contract.
		32. Plan for contract administration regarding delegating administrative functions; designating, training and managing CORs; and formally establishing all contract administration responsibilities.
	Contract Performance Management	33. Administer contract by monitoring contracting officer representatives feedback, contractor performance, and enforcing contractor compliance with contract requirements.
		34. Ensure past performance evaluation is initiated to ensure documentation of performance including contracting officer input.
		35. Analyze, negotiate, and prepare claims file in order to issue final decisions.
		36. Resolve contract performance problems by gathering facts, determining remedies, and initiate remedial actions in

11 Units of Competence: 10 Technical Units and 1 Professional Unit	28 Technical Competencies 10 Professional Competencies	52 Technical Elements, 10 Professional Elements
		order to find and provide a solution.
	Issue Changes and Modifications	37. Analyze the need for contract modifications and negotiate and issue contract modifications, as required.
	Approve Payment Requests	38. Approve contractor request for payments to include final vouchers under cost reimbursement contracts, progress payments, performance-based payments, or commercial financing.
	Close-out Contracts	39. Close-out contracts following proper procedure to ensure property disposition, final payments, and documents/clearances have been received.
Small Business/Socio-Economic Programs	Addressing Small Business Concerns	40. Assist small business concerns in understanding how to do business with the government, identifying contracting opportunities, and responding to small business inquiries regarding payment delays or problems.
		41. Serve as a small business specialist and assist the Small Business Administration's assigned representative in conducting annual reviews of small business share, evaluation of contractors' subcontracting performance, and planning to maximize the use of small businesses.
		42. As a small business specialist provide recommendations on acquisition documents as to whether a particular acquisition should be set aside for one of the Small Business programs.
Negotiate FPRAs & Administer Cost Accounting Standards	Negotiate Forward Pricing Rates Agreements & Administer Cost Accounting Standards	43. Negotiate forward pricing rate agreements (FPRAs) for billing purposes and administer cost accounting standards to ensure contractor's compliance.
Contract Termination	Contract Termination	44. Terminate contracts using applicable FAR (and supplemental) requirements if it is in the best interest in the government (either termination for convenience or cause/default).
Procurement Policy	Procurement Analysis	45. Provide analysis to advise on procurement matters including contract documentation, legislation issues, and congressional inquiries impacting contracting matters.
		46. Develops procurement policy and changes in procedures through analysis of major procurements for statutory and regulatory compliance and a macro-analysis of contracting

11 Units of Competence: 10 Technical Units and 1 Professional Unit	28 Technical Competencies 10 Professional Competencies	52 Technical Elements, 10 Professional Elements
		matters.
		47. Advise on high-level legislation & policy matters to recommend &/or lead change in the procurement process.
		48. Perform oversight & audits to review contract files, compile lessons learned, & ensure consistent policy application.
E-Business Related	E-Business and Automated Tools	49. Use e-business systems and automated tools to promote standardization, efficiency, and transparency.
	Activity Program Coordinator for Purchase Card	50. Performs oversight and execution for the Purchase Card Program.
Construction/Architect & Engineering (A&E)	Construction/Architect & Engineering (A&E)	51. Develops acquisition strategies, issues notices/solicitations, conducts negotiations, selects sources, awards/ administers contracts for construction & A&E in accordance w/reqts & procedures associated w/construction & A&E outlined in the FAR & supplemental policy & procedures (w/particular attention to FAR Part 36).
Contracting in a Contingent and/or Combat Environment	Contracting in a Contingent and/or Combat Environment	52. Apply contracting expertise during deployments, contingency operations, or responses to natural disasters
Professional Competency	Problem Solving	1. Problem Solving - Identifies and analyzes problems; weighs relevance and accuracy of information; generates and evaluates alternative solutions; makes recommendations.
	Customer Service	2. Customer Service - Anticipates and meets the needs of both internal and external customers. Delivers high-quality products and services; is committed to continuous improvement.
	Oral Communication	3. Oral Communication - Makes clear/convincing oral presentations. Listens effectively; clarifies info as needed.
	Written Communication	4. Written Communication - Writes in a clear, concise, organized, & convincing manner for the intended audience.
	Interpersonal Skills	5. Interpersonal Skills - Treats others with courtesy, sensitivity, and respect. Considers and responds appropriately to the needs and feelings of different situations

11 Units of Competence: 10 Technical Units and 1 Professional Unit	28 Technical Competencies 10 Professional Competencies	52 Technical Elements, 10 Professional Elements
	Decisiveness	6. Decisiveness - Makes well-informed, effective, and timely decisions, even when data are limited or solutions produce unpleasant consequences; perceives the impact and implications of decisions.
	Technical Credibility	7. Technical Credibility - Understands and appropriately applies principles, procedures, requirements, regulations, and policies related to specialized expertise
	Flexibility	8. Flexibility - Is open to change and new information; rapidly adapts to new information, changing conditions, or unexpected obstacles.
	Resilience	9. Resilience - Deals effectively with pressure; remains optimistic and persistent, even under adversity. Recovers quickly from setbacks.
	Accountability	10. Accountability - Holds self and others accountable for measurable high-quality, timely, and cost-effective results. Determines objectives, sets priorities, and delegates work. Accepts responsibility for mistakes. Complies with established control systems and rules.


Career Development
Job Performance
Executive & Leadership
Training Courses
Knowledge Sharing
DAU
Mission Assistance
Continuous Learning
AT&L Performance Learning Model

THIS PAGE INTENTIONALLY LEFT BLANK

SUPPLEMENTAL. AFSC 6C0X1 CONTRACTING

Supplemental information is provided for additional guidance to assist in the development of an on-the-job training program as identified in Chapter 4, Recommendations. This is the Air Forces AFSC 6C0X1 Contracting Career Field Education and Training Plan for enlisted. This type of program again would increase every contracting professional's tacit knowledge levels, thus reducing the tacit knowledge and explicit knowledge gaps. Implementation of a standardized OJT program would focus on the required critical contracting skills necessary to build a solid contracting knowledge foundation.

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

Aufderheide, D., Corrigan, M., and Maloy, J. (2011). *Air Force operational contracting knowledge assessment: Analyzing explicit and tacit contracting knowledge*. (MBA professional report). Retrieved from www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA556101.

Defense Acquisition University. (2013). *Defense Acquisition University annual report 2012*. Retrieved from http://www.dau.mil/publications/ATLdocs/Annual_report

Defense Acquisition University. (2014). AT&L performance learning model. Retrieved from http://www.dau.mil/plm/plm.asp.

Defense Acquisition Workforce Improvement Act. 10 U.S.C. ch. 87 (2001). Retrieved August 2013, http://www.acq.osd.mil/se/docs/dawia.pdf.

Department of Defense Inspector General. (2009). *Summary of DOD Office of Inspector General audits of acquisition and contract administration* (DOD IG Report No. D-2009071). Washington, DC. Retrieved from http://www.dodig.mil/audit/reports/fy09/09-071.pdf.

Director, Defense Procurement and Acquisition Policy. (2008). Competency-based management for the DOD-wide contracting community. Retrieved from http://www.acq.osd.mil/dpap/ops/contracting_competency_assessment.html.

Defense Procurement and Acquisition Policy. (2010). Department of Defense contracting workforce competency assessment final report. Retrieved from https://dap.dau.mil.

Dhanaraj, C., Lyles, M. A., Steensma, H. K., and Tihanyi, L. (2004). Managing tacit and explicit knowledge transfer in IJVs: The role of relational embeddedness and the impact on performance. *Journal of International Business Studies 35*, 428–442. doi:10.1057/palgrave.jibs.8400098.

Frost, A. (2010). The different types of knowledge [Home page]. Retrieved from http://www.knowledge-management-tools.net.

Gabbert, J. A. (2014, March). Annex A to O-14-084-01 MICC organizational chart—contracting support. U.S. Army Mission and Installation Contracting Command, FT Drum, NY. (Unpublished PowerPoint presentation).

Gansler, J. S., Berteau, D. J., Maddox, D. M., Oliver, D. R., Salomon, L. E., & Singley III, G. T. (2007). *Urgent reform required: Army expeditionary contracting*. Washington, DC: Report of the Commission on Army Acquisition and Program Management in Expeditionary Operations. Retrieved from https://dap.dau.mil/policy/Documents/Policy/DAW%20Report%20To%20Congress%202010.pdf.

Government Accountability Office. (2006). *Contract management: DOD vulnerabilities to contracting fraud, waste, and abuse* (GAO-06-838R). Washington, DC: Government Accountability Office. Retrieved from http://www.gao.gov/products/GAO-06-838R.

Government Accountability Office. (2009). *DOD: Additional actions are needed to effectively manage and oversee DOD's acquisition workforce* (GAO-09-342). Washington, DC: Government Accountability Office. Retrieved from http://www.gao.gov/products/GAO-09-342.

Government Accountability Office. (2010). *Defense acquisition workforce: DOD's training program demonstrates many attributes of effectiveness, but improvement is needed* (GAO-11-22). Washington, DC: Government Accountability Office. Retrieved from http://www.gao.gov/products/GAO-11-22.

Government Accountability Office. (2013). *High-risk series: An update* (GAO-13-283). Washington, DC: Government Accountability Office. Retrieved from http://www.gao.gov/products/GAO-13-283.

Manning, L., Thomas, M., & Brooks, T. (2008). DOD plans for the contracting future: The contracting competency model. *Defense AT&L,* November-December, 44–47. Retrieved http://www.dau.mil/pubscats/pubscats/atl/2008_11_12/brooks_nd08.pdf.

Nonaka, I. (1991, November–December). Knowledge creating company. *Harvard Business Review*, 96–104. Retrieved from http://www3.uma.pt/filipejmsousa/ge/Nonaka,%201991.pdf.

Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Retrieved from http://books.google.com/books?hl=en&lr=&id=B-qxrPaU1-MC&oi=fnd&pg=PA3&dq=The+knowledge-creating+company:+How+Japanese+companies+create+the+dynamics+of+innovation&ots=XgYMrxwjf0&sig=KhV1Ql0YRXV2dKH2bXecqZ4Sq2k#v=onepage&q=The%20knowledge-creating%20company%3A%20How%20Japanese%20companies%20create%20the%20dynamics%20of%20innovation&f=false.

Pfeffer, J., & Sutton, R. I. (2000). *The knowing-doing gap: How smart companies turn knowledge into action*. Retrieved from http://books.google.com/books?id=MeY5hdgj1bAC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.

Polanyi, M. (1964). *Personal knowledge: Towards a post-critical philosophy*. Retrieved from http://books.google.com/books?hl=en&lr=&id=0Rtu8kCpvz4C&oi=fnd&pg=PP1&dq=Personal+Knowledge:+Towards+a+post-critical+philosophy&ots=auhCIoZ2Qk&sig=ZnN9Fbun1xE1d4yGkuI8LOnwr9c#v=onepage&q=Personal%20Knowledge%3A%20Towards%20a%20post-critical%20philosophy&f=false.

The President's Blue Ribbon Commission on Defense Management. (1986). *A quest for excellence: Final report to the president and appendix*. Washington, DC: The Packard Commission. Retrieved from http://www.ndia.org/Advocacy/AcquisitionReformInitiative/Documents/Packard-Commission-Report.pdf.

Rendon, R. G. (2008). Contract management process maturity: Analysis of recent organizational assessments. In *Proceedings 3rd International Public Procurement Conference* (28–30). Retrieved from https://calhoun.nps.edu/handle/10945/40258.

Rendon, R. G. (2011, April). *Assessment of Army Contracting Command's contract management processe*s (TACOM and RDECOM) (NPS-GSBPP-11-008). Monterey, CA: Retrieved from http://www.acquisitionresearch.net/files/FY2011/NPS-CM-11-019.pdf.

Snider, K. (1996, fall). DAWIA and the price of professionalism. *Acquisition Review Quarterly*, 97–108. Retrieved from http://www.dau.mil/AckerLibrary/AckerLibraryDocs/snide.pdf.

Under Secretary of Defense. (2007). *Human capital strategic plan v3.0*. Washington, DC: Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. Retrieved from http://www.dau.mil/workforce/Shared%20Documents/hcsp.pdf.

Under Secretary of Defense. (2008). *Operation of the defense acquisition system* (DOD Instruction 5000.02). Washington, DC: Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. Retrieved from http://www.acq.osd.mil/asda/docs/dod_instruction_operation_of_the_defense_acquisition_system.pdf.

Under Secretary of Defense. (2014). *Defense acquisition workforce key informatio*n. Washington, DC: Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. Retrieved from https://dap.dau.mil/workforce/Documents/FY13Q4/FY13%20(Q4)%20Contracting%20Information%20Summary.pdf.

United States Army Mission and Installation Contracting Command. (2014, April). *MICC fact sheet*. JSBA-Fort Sam Houston, TX: United States Army Mission and Installation Contracting Command. Retrieved from http://www.micc.army.mil/pdf/MICC-Fact-Sheet-April-2014.pdf

Wilson, J.R. (2013). *State of AMC looking forward. U.S. Army Material Command* 2013–2014 ed.. Redstone Arsenal, AL United States Army Material Command. Retrieved: http://www.amc.army.mil/amc/publications/AMCCMDBrch.pdf.

Vollmecke, K. F. (2013, November). MICC command overview. U.S. Army Mission and Installation Contracting Command, FT Drum, NY. (Unpublished PowerPoint presentation).

United States Army Mission and Installation Contracting Command. (2014, April). *MICC fact sheet*. JSBA-Fort Sam Houston, TX: United States Army Mission and Installation Contracting Command. Retrieved from http://www.micc.army.mil/pdf/MICC-Fact-Sheet-April-2014.pdf

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California