Assessing the Relationship of Training, Education, and Experience to Workforce Readiness and Program Performance

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Agenda

- Purpose of Study

- Background

- What's the Problem

- Method and Scope

- Discussion

- Conclusion and Recommendations

Purpose of Study

The purpose of this research is to assess the effectiveness of training and education relative to the effectiveness of the acquisition workforce and program performance.

- There is an intrinsic ***value of deep and continuous education*** to the defense acquisition workforce, where the knowledge, skills, and habits of mind are developed through both formal schooling and a personal, self-directed effort to learn the profession of arms.
- Junior officers and career civilians are completing Defense Acquisition Workforce Improvement Act (DAWIA) level III training long before they have developed the corresponding experience.
- This study investigates the alignment and context between education, training, and experience to the operational environment by examining gaps in relation to the mode and timing of training and education with regard to certification.

BLUF: A lifelong learning model that emphasizes complementary training and education at the right time may be more effective for the high performing acquisition workforce member!

Background

- Defense programs continue to be challenged with delivering capability within cost, schedule, and performance.

- Current DOD policy allows certification for DAWIA level III through online and resident training and other equivalent providers.

- Practical experience, training, and education varies and can influence performance outcomes, ultimately having an impact on the effectiveness of acquisition professionals as they perform their jobs in the program management environment.

- Both focused job specific training/competencies and the application of critical thinking skills are necessary to succeed in the business of defense.

Problem and Hypothesis

The DoD may not adequately understand the value of training and education to program performance. Additionally, there seems to be a mismatch in the talent management path some acquisition professionals follow necessary to optimize the defense business process required to meet the operational and strategic needs of the DoD.

Research Questions:

- Does DAWIA Training provide practical and comprehensive training to enable acquisition professional to perform at DAWIA Level III?
- Does the DAWIA equivalent provider process provide practical and comprehensive training to enable acquisition professionals to perform at DAWIA Level III?
- What role does graduate education have as an equivalent provider to improving DoD program execution and performance?

Hypothesis: Education, experience, and training have significant influence on application and performance for acquisition professionals

Research Framework
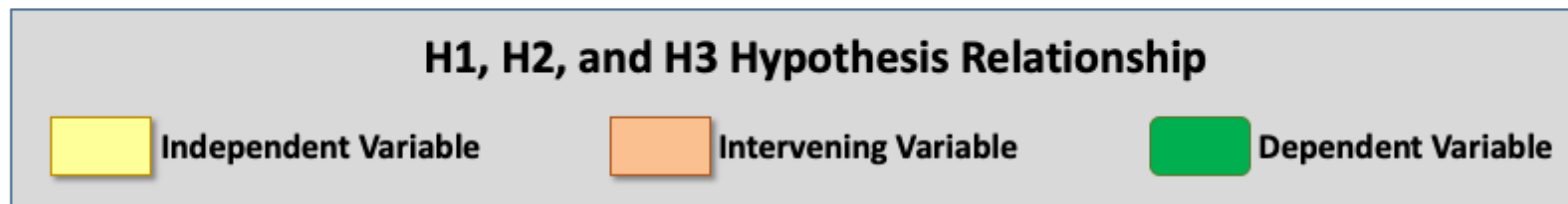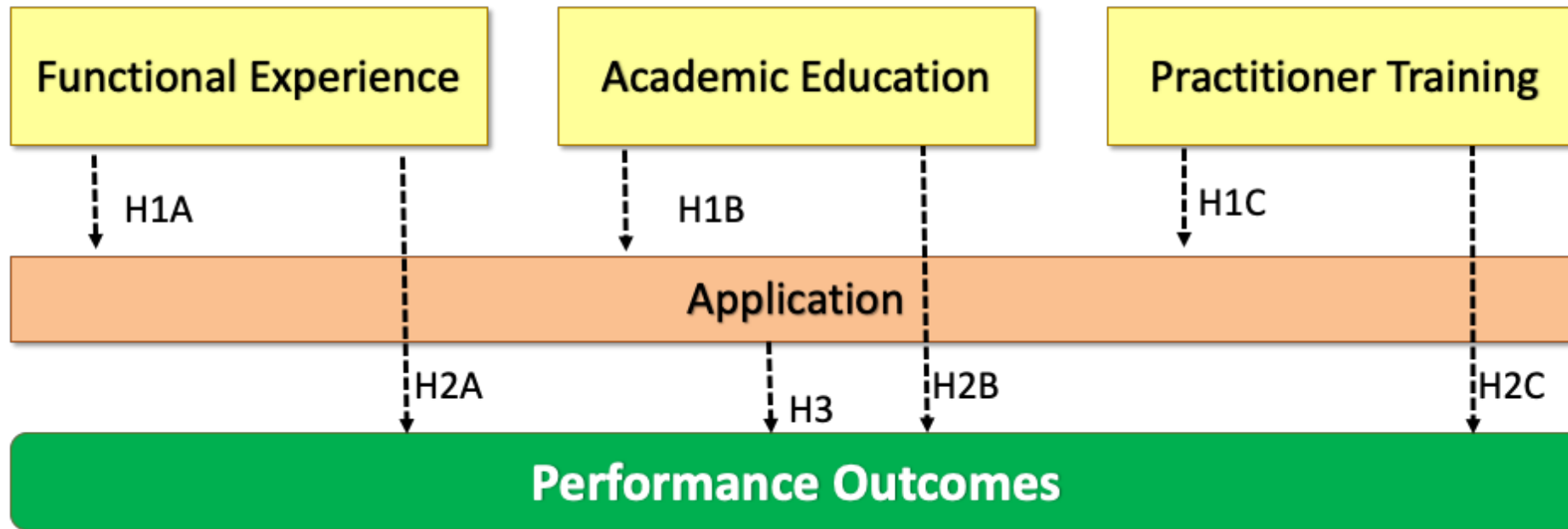
Method and Scope

- Conducted a comprehensive survey of the Defense Acquisition Workforce (Program Management, Engineering, and Contracts). ***287 responses from Program Management workforce***.

- The survey focused on the training, education and experience and their perceived value of the training and education received to produce performance outcomes and execute functional competencies.

- Focused on feedback from the work force and did not draw direct correlation with program performance through other data sources.

- The data will be categorized by training level, education modality, experience level, and perceived value of training and education.

- An analysis of variance was conducted in order to split an observed aggregate variability found inside a data set into two parts: systematic factors and random factors. The systematic factors have a statistical influence on the given data set, while the random factors do not.

- ANOVA allows us to test to the influence of the independent variables on the dependent variables in a regression study. In our study the dependent variables are perceived ability of the acquisition professional to perform their acquisition related and perceived relationship of training and education to overall program performance.

- A paired two-sample Student's t-Test was conducted to determine whether observations that are taken before and after obtaining Level III Certifications with the independent variable of Experience, Education, and Training. The t-Test allowed us to test if the means were equal and determine if the null hypothesis should be rejected.

Initial Findings

- The application of the acquisition process is significantly influenced by the level and timing of training, education, and experience an individual has received.
  - There seems to be a gap between education and critical Program Management performance competencies.
- Timely training, education and experience have a significant impact on acquisition workforce performance
  - Training higher than level I for acquisition workforce members with less than 2 years of experience has little significant value in application and performance
  - Highest gains for training occur between 3-7 years of acquisition experience
  - There is limited training/education requirement for senior acquisition professionals
- DAWIA training from equivalent providers do not appear to be aligned with periods of significant confidence and performance gains resulting from complementary nature of experience and training.

Anova – Mean Gap and Variance Analysis

Survey Statement: Please help us understand the foundation for your confidence to Apply the Process and to Obtain the Expected Outcome with each proficiency you selected.

"Manage through agile principles that account for any changes in cost, schedule, and performance. "

Assess based upon your Experience, Training, and Education level consider before and after your achievement of level III certification when rating your confidence from its application of the acquisition processes and to the achievement (outcomes) of the proficiency itself.

	Before	After	GAP Improvement	VAR Before	VAR After	Change
WHEN APPLYING THE PROCESS w/ EXPERIENCE Before and After	3.13514	4.33333	0.99099	1.336118	0.533333	0.802785
WHEN APPLYING THE ACHIEVEMENT w/ EXPERIENCE Before and After	3.39640	4.36036	0.96396	1.405078	*0.523505*	0.881572
WHEN APPLYING THE PROCESS w/ EDUCATION Before and After	3.13514	4.02703	0.89189	1.336118	0.826536	0.509582
WHEN APPLYING THE ACHIEVEMENT w/ EDUCATION Before and After	3.16216	4.08108	0.91892	1.300737	0.711548	0.589189
WHEN APPLYING THE PROCESS w/ TRAINING Before and After	3.10811	4.08108	0.97297	1.206388	0.729730	0.476658
WHEN APPLYING THE ACHIEVEMENT w/ TRAINING Before and After	3.13514	4.10811	0.97297	1.190663	0.660934	0.529730

We reject the null hypothesis that there is no difference among the means of before and after application of the Acquisition Processes and achieving Performance Outcomes when applied to Experience, Education and, Training,

Anova – Mean Gap and Variance Analysis

Survey Statement: Please help us understand the foundation for your confidence to Apply the Process and to Obtain the Expected Outcome with each proficiency you selected.

"Build, align, and execute a program budget that included a Flexible Spend Plan that anticipated any budget eventualities including CRA effects and other funding realignments. "
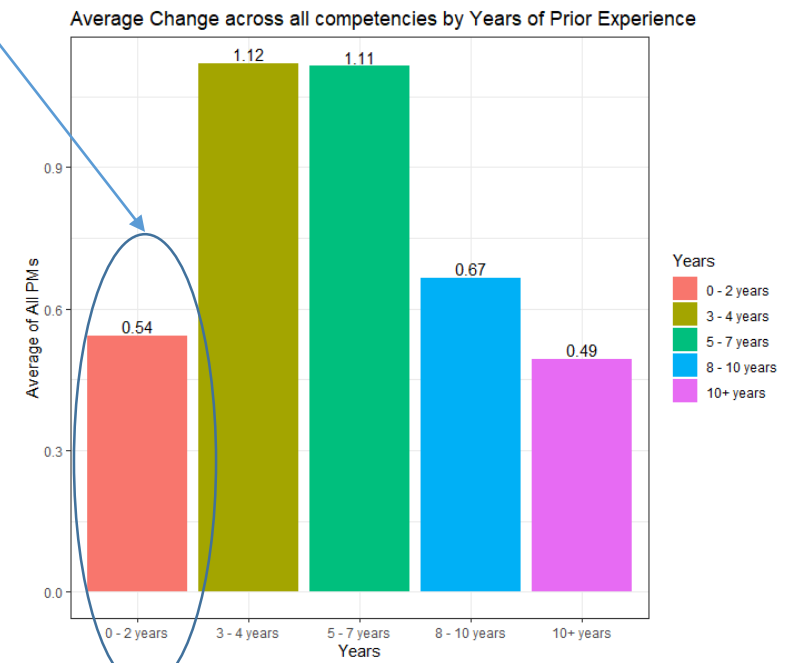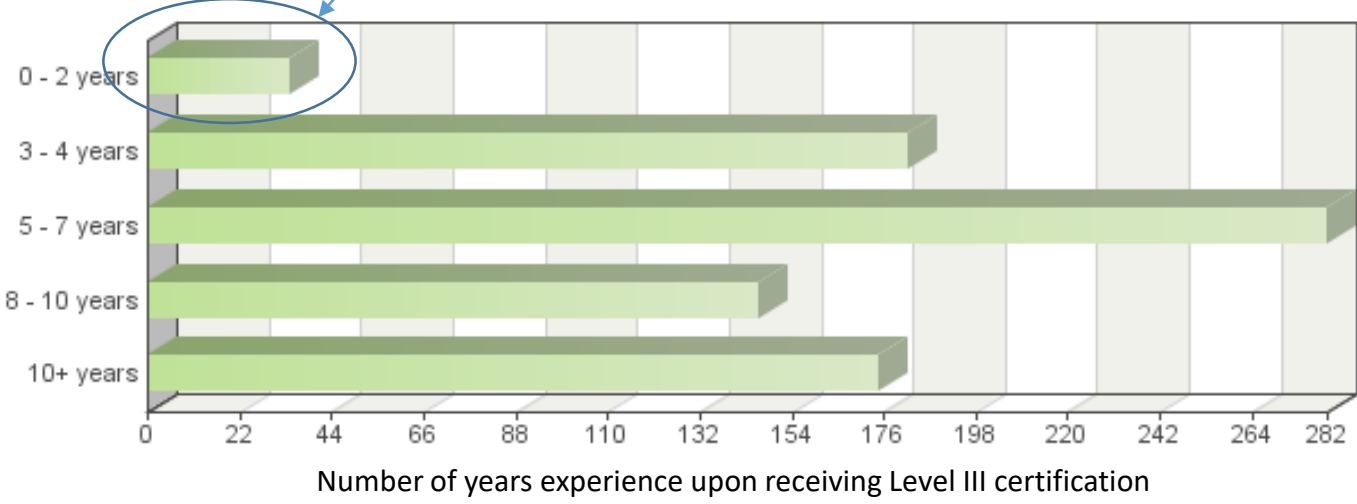
Assess based upon your Experience, Training, and Education level consider before and after your achievement of level III certification when rating your confidence from its application of the acquisition processes and to the achievement (outcomes) of the proficiency itself.

	Before Cert	After Cert	GAP Improvement	VAR Before	VAR After	Change
WHEN APPLYING THE PROCESS EXPERIENCE Before and After	3.13514	4.33333	0.99099	1.336118	0.533333	0.802785
WHEN APPLYING THE ACHIEVEMENT EXPERIENCE Before and After	3.39640	4.36036	0.96396	1.405078	*0.523505*	0.881572
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WHEN APPLYING THE ACHIEVEMENT EDUCATION Before and After	3.16216	4.08108	0.91892	1.300737	0.711548	0.589189
WHEN APPLYING THE PROCESS TRAINING Before and After	3.10811	4.08108	0.97297	1.206388	0.729730	0.476658
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We reject the null hypothesis that there is no difference among the means of before and after application of the Acquisition Processes and achieving Performance Outcomes when applied to Experience, Education and, Training,

Experience v. Certification

Graduate Equivalent Level III training Occurs between 0-2 years of acquisition experience

Number of years experience upon receiving Level III certification

Average Change across all competencies by Years of Prior Experience

Greatest gains in understanding and ability appears to be in 3-7 year period

Level III certification between 0-3 years experience has low impact with regard to confidence and performance. At least three years experience appears to be the earliest intermediate to advanced training begins to show positive gains.

Typical Timeline

	Initial Service	Entry Acquisition Workforce	Intermediate Experience	Advanced Experience	Executive Experience
Time in Service	1-3yrs	3-5yrs	5-10 yrs	10+ yrs	
Time in Acquisition Work Force	0 yrs	1-3yrs	4-7 yrs	8 + yrs	
DAWIA Level Training Required		Level 1	Level 2	Level 3	Level 3
Asst. Product Manager Selection			5 -7 yrs		
Product/Program Manager Selection				12+ yrs	
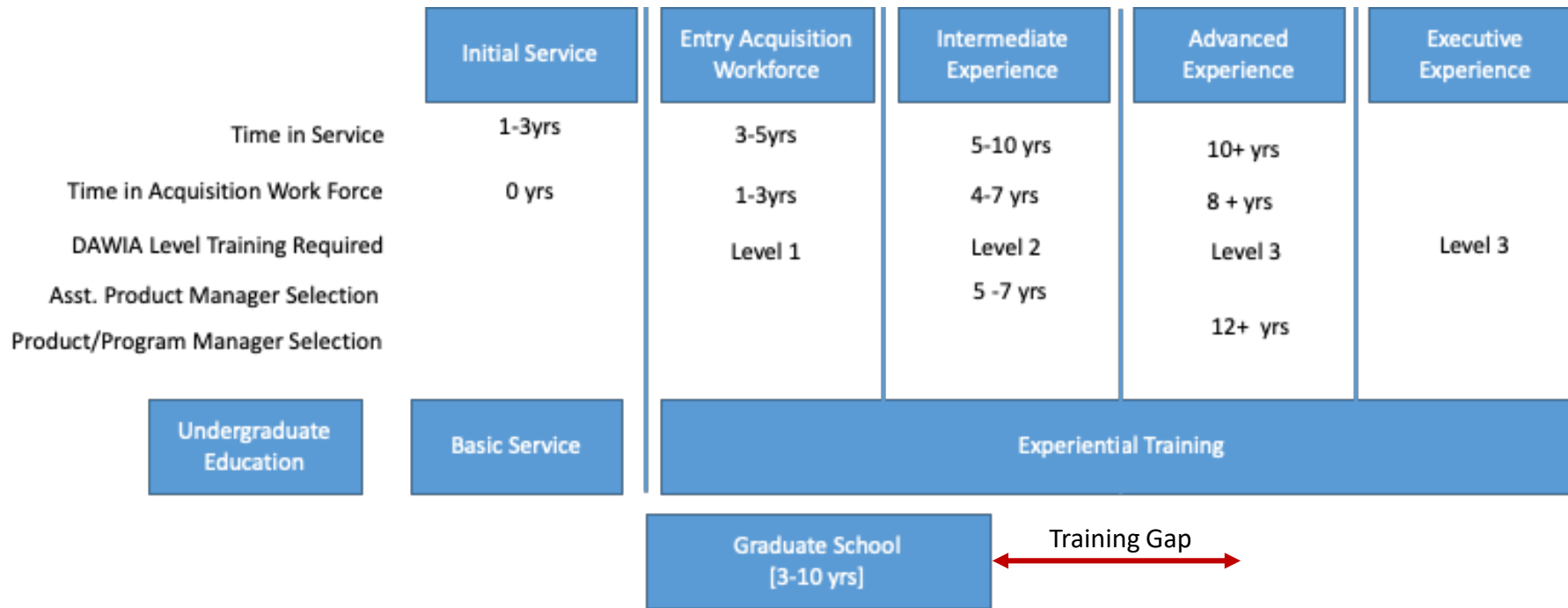
Continuous Experience needs to align with Training Delivery

| Undergraduate Education | Basic Service | Experiential Training | | |

Graduate School [3-10 yrs] Training Gap

- Equivalent DAWIA training sources allows students to obtain DAWIA Level III training years prior to commensurate experience level.
- Senior Executive training is limited beyond current Level III training model
- Most training gains are reported during 4-7 years of acquisition experience

Lexical Key Words Analysis
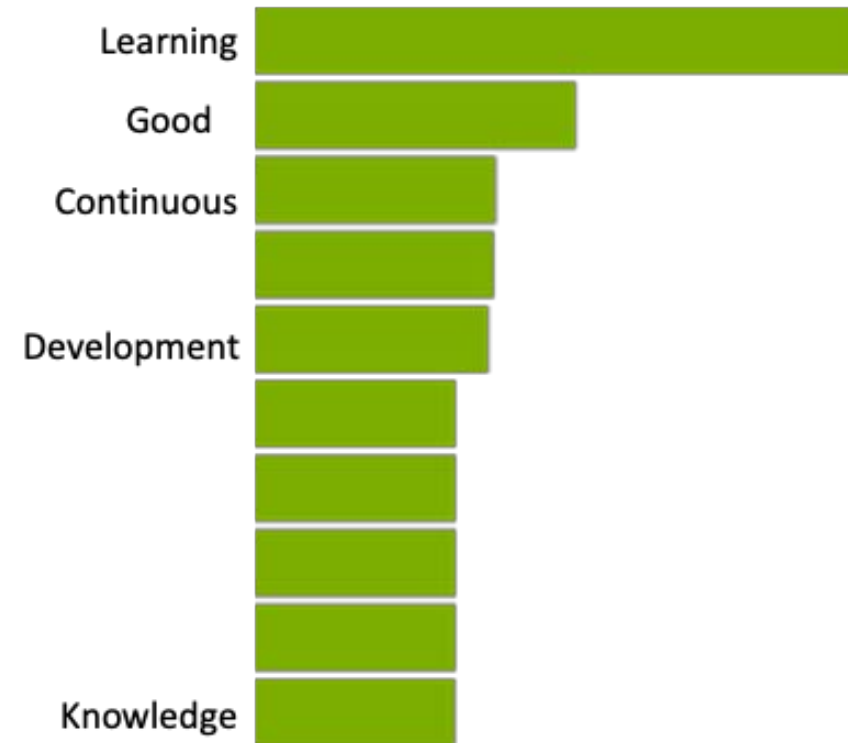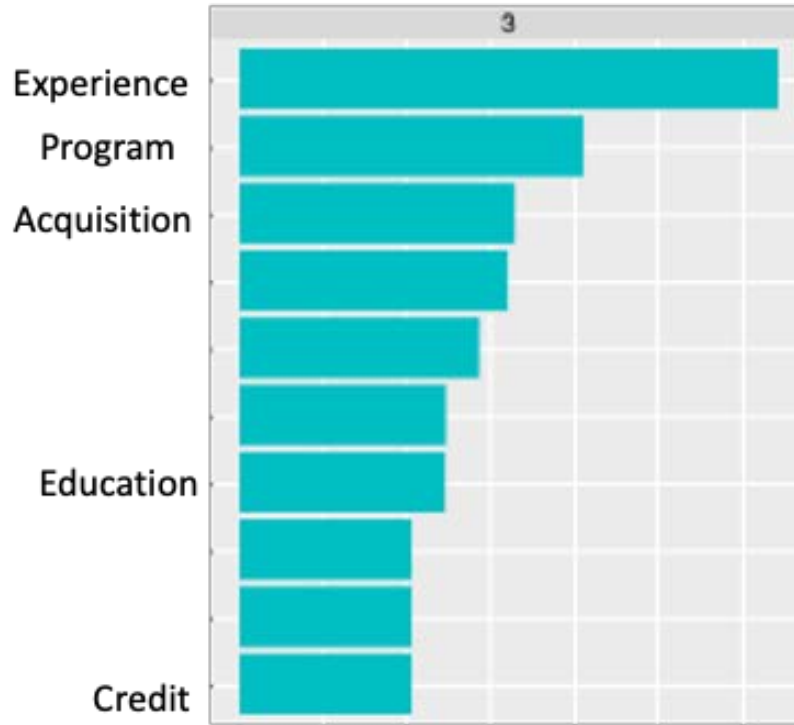
Respondent highest key words focused on Learning and experience

Discussion and Conclusions

- Timing of Education and Training coupled with the corresponding experiences, lead to significant achievement in performance outcomes and competencies.
    - Respondents with 1-3 years of training had the least amount of gains in ability and confidence to perform their mission.
    - Respondents with more than 10 years of experience had diminishing gains in confidence to perform their mission.
    - Providing training to workforce before commensurate experience appears to have less value than focused continuous training aligned with practical experience.
- Significant amount of respondents preferred continuous and hands on training
- Specific DAWIA training through higher education was less effective than focusing on the continuous lifelong learning (training) model
- The roles of training and education are being conflated; while both are necessary:
    - ***Training focuses on specific mission objectives*** and functional competencies at the time of need.
    - Education reinforces ***critical broad thinking skills and behaviors*** necessary for acquisition leaders

DAWIA training should be lifelong and continuous, focused on position requirements while education should focus on complex critical thinking challenges faced by acquisition leaders.

Recommendations

- Training for 1-3 year acquisition workforce members should focus on level 1 and 2 skill levels emphasizing basic concepts, competencies, and relationships

- Training for level 3 should not begin until acquisition workforce members have at least 4-7 years of experience and should focus on complex process tasks required for specific acquisition positions.

- Training and education should continue for senior level members 10+ years in order to maintain currency and critical thinking skills.

- Higher education should focus on critical thinking and conceptual learning relating broad concepts with performance outcomes rather than specified training tasks.

- Recommend further analysis and funding of this project to examine the entire study population and the impacts on education and training performance and effectiveness.

A lifelong learning model that emphasizes complementary training and education at the right time may be more effective for the high performing acquisition workforce member!

Backup

ANOVA – Gap Analysis

Understanding the application of the Acquisition Processes and Performance Outcomes with respect to Experience, Education, and Training.

"Manage through agile principles that account for any changes in cost, schedule, and performance."

Anova: Single Factor

WHEN APPLYING THE PROCESS and EXPERIENCE Before and After

Gap Analysis
ANOVA – Understanding the
Acquisition Process and Experience

SUMMARY

Groups	Count	Sum	Average	Variance
Experience B4	111	371	3.342342342	1.409009009
Experience After	111	481	4.333333333	0.533333333
Mean GAP			0.990990991	

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	54.5045	1	54.5045045	56.12244898	1.6374E-12	3.884075
Within Groups	213.6577	220	0.971171171			
			t =	7.491491773		
Total	268.1622	221				

Anova: Single Factor

WHEN APPLYING THE ACHIEVEMENT and EXPERIENCE Before and After

Gap Analysis
ANOVA – Achievement
(Outcomes) and Experience

SUMMARY

Groups	Count	Sum	Average	Variance
Experience B4	111	377	3.396396396	1.405077805
Experience After	111	484	4.36036036	0.523505324
Mean GAP			0.963963964	

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	51.57207207	1	51.57207207	53.48182436	4.80012E-12	3.884074683
Within Groups	212.1441441	220	0.964291564			
			t =	7.313126852		
Total	263.7162162	221				

Anova: Single Factor

WHEN APPLYING THE PROCESS and EDUCATION Before and After

SUMMARY

Groups	Count	Sum	Average	Variance
Education B4	111	348	3.135135135	1.336117936
Education After	111	447	4.027027027	0.826535627
Mean GAP			0.891891892	

Gap Analysis
ANOVA – Understanding the Acquisition Process and Education

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	44.14865	1	44.14864865	40.82822086	9.7825E-10	3.884075
Within Groups	237.8919	220	1.081326781			
			t =	6.389696461		
Total	282.0405	221				

Anova: Single Factor

WHEN APPLYING THE ACHIEVEMENT and EDUCATION Before and After

SUMMARY

Groups	Count	Sum	Average	Variance
Education b4	111	351	3.162162162	1.300737101
Education after	111	453	4.081081081	0.711547912
Mean GAP			0.918918919	

Gap Analysis
ANOVA – Achievement (Outcomes) and Education

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	46.86486486	1	46.86486486	46.57875458	8.43223E-11	3.884074683
Within Groups	221.3513514	220	1.006142506			
			t =	6.824862971		
Total	268.2162162	221				

"*Manage through agile principles that account for any changes in cost, schedule, and performance.*"

Anova: Single Factor

WHEN APPLYING THE PROCESS and TRAINING Before and After

SUMMARY

Groups	Count	Sum	Average	Variance
Training B4	111	345	3.108108108	1.206388206
Training After	111	453	4.081081081	0.72972973
Mean GAP			0.972972973	

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	52.54054	1	52.54054054	54.27411168	3.4721E-12	3.884075
Within Groups	212.973	220	0.968058968			
			t =	7.367096557		
Total	265.5135	221				

Gap Analysis
ANOVA – Understanding the
Acquisition Process and Training

Gap Analysis
ANOVA – Achievement
(Outcomes) and Training

Anova: Single Factor

WHEN APPLYING THE ACHIEVEMENT and TRAINING Before and After

SUMMARY

Groups	Count	Sum	Average	Variance
Training b4	111	348	3.135135135	1.190663391
Training after	111	456	4.108108108	0.660933661
Mean GAP			0.972972973	

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	52.54054054	1	52.54054054	56.75159236	1.26938E-12	3.884074683
Within Groups	203.6756757	220	0.925798526			
			t =	7.533365274		
Total	256.2162162	221				

"Build, align, and execute a program budget that included a Flexible Spend Plan that anticipated any budget eventualities including CRA effects and other funding realignments. "

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
EXPERIENCE B4	84	276	3.285714	1.507745
EXPERIENCE After	84	358	4.261905	0.629375
GAP			0.97619	0.878371

Gap Analysis
ANOVA – Understanding the Acquisition Process and Experience

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	40.02381	1	40.02381	37.45584	6.51423E-09	3.89808858
Within Groups	177.381	166	1.06856			
			t = 6.120118			
Total	217.4048	167				

Gap Analysis
ANOVA – Achievement (Outcomes) and Experience

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Experience B4	84	280	3.333333333	1.40562249
Experience After	84	358	4.261904762	0.629374641
			0.928571429	0.776247849

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	36.21428571	1	36.21428571	35.59148576	1.43E-08	3.898089
Within Groups	168.9047619	166	1.017498566			
			t = 5.965860019			
Total	205.1190476	167				

"Build, align, and execute a program budget that included a Flexible Spend Plan that anticipated any budget eventualities including CRA effects and other funding realignments. "

Anova: Single Factor

<div style="background-color:green">WHEN APPLYING THE PROCESS and EDUCATION Before and After</div>

SUMMARY

Groups	Count	Sum	Average	Variance
Education B4	84	263	3.130952	1.585055
Education After	84	335	3.988095	0.951664
			0.857143	0.633391

Gap Analysis
ANOVA – Understanding the Acquisition Process and Education

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	30.85714	1	30.85714	24.3284	1.95864E-06	3.89808858
Within Groups	210.5476	166	1.268359			
			t =	4.932382		
Total	241.4048	167				

Gap Analysis
ANOVA – Achievement (Outcomes) and Education

Anova: Single Factor

<div style="background-color:green">WHEN APPLYING THE ACHIEVEMENT and EDUCATION Before and After</div>

SUMMARY

Groups	Count	Sum	Average	Variance
Education B4	84	265	3.154761905	1.554073437
Education After	84	332	3.952380952	1.009753299
			0.797619048	0.544320138

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	26.7202381	1	26.7202381	20.84402797	9.66E-06	3.898089
Within Groups	212.797619	166	1.281913368			
			t =	4.565526035		
Total	239.5178571	167				

"Build, align, and execute a program budget that included a Flexible Spend Plan that anticipated any budget eventualities including CRA effects and other funding realignments. "

Anova: Single Factor

WHEN APPLYING THE PROCESS and TRAINING Before and After

SUMMARY

Groups	Count	Sum	Average	Variance
Training B4	84	255	3.035714	1.408348
Training After	84	337	4.011905	1.048049
			0.97619	0.360298

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	40.02381	1	40.02381	32.58741	5.13284E-08	3.89808858
Within Groups	203.881	166	1.228199			
				t =	5.708538	
Total	243.9048	167				

Gap Analysis
ANOVA – Understanding the Acquisition Process and Training

Gap Analysis
ANOVA – Achievement (Outcomes) and Training

Anova: Single Factor

WHEN APPLYING THE ACHIEVEMENT and TRAINING Before and After

SUMMARY

Groups	Count	Sum	Average	Variance
Training B4	84	256	3.047619048	1.443488239
Training After	84	335	3.988095238	0.927567413
			0.94047619	0.515920826

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	37.14880952	1	37.14880952	31.33524893	8.81E-08	3.898089
Within Groups	196.797619	166	1.185527826			
				t =	5.597789646	
Total	233.9464286	167				

T-Test – Paired Samples

The analysis performed through a paired two-sample Student's t-Test to determine whether observations that are taken before and after obtaining Level III Certifications for the independent variable of Experience, Education, and Training.

t-Test: Paired Two Sample for Means

PM (5) Institute a talent and development program that created a solid foundation to generate experience and self-development.

Experience and Process Before and After

t-Test: Paired Two Sample for Means

WHEN APPLYING THE PROCESS		
	Experience After	*Experience B4*
Mean	4.421052632	3.543859649
Variance	0.533834586	1.288220551
Observations	57	57
Hypothesized Mean Difference	0	
df	56	
t Stat	6.998950236	
P(T<=t) one-tail	1.73735E-09	
t Critical one-tail	1.672522303	
P(T<=t) two-tail	3.4747E-09	
t Critical two-tail	2.003240719	

Education and Process Before and After

t-Test: Paired Two Sample for Means

WHEN APPLYING THE PROCESS		
	Education After	*Education B4*
Mean	4.122807018	3.385964912
Variance	0.931077694	1.276942356
Observations	57	57
Hypothesized Mean Difference	0	
df	56	
t Stat	6.202200393	
P(T<=t) one-tail	3.5567E-08	
t Critical one-tail	1.672522303	
P(T<=t) two-tail	7.1134E-08	
t Critical two-tail	2.003240719	

Training and Process Before and After

t-Test: Paired Two Sample for Means

WHEN APPLYING THE PROCESS		
	Training after	*Training B4*
Mean	4.192982456	3.333333333
Variance	0.729949875	1.333333333
Observations	57	57
Hypothesized Mean Difference	0	
df	56	
t Stat	6.439966204	
P(T<=t) one-tail	1.44984E-08	
t Critical one-tail	1.672522303	
P(T<=t) two-tail	2.89969E-08	
t Critical two-tail	2.003240719	

T-Stat is greater than t-Critical. Therefore, we reject the null hypothesis that there is no difference in the mean.

t-Test: Paired Two Sample for Means

PM (5) Institute a talent and development program that created a solid foundation to generate experience and self-development.

Experience and Achievement (Outcomes) Before and After

t-Test: Paired Two Sample for Means

IN ACHIEVEMENTOF RESULTS		
	Experience After	*Experience B4*
Mean	4.543859649	3.684210526
Variance	0.431077694	1.184210526
Observations	57	57
Hypothesized Mean Difference	0	
df	56	
t Stat	6.556268354	
P(T<=t) one-tail	9.33452E-09	
t Critical one-tail	1.672522303	
P(T<=t) two-tail	1.8669E-08	
t Critical two-tail	2.003240719	

Education and Achievement (Outcomes) Before and After

t-Test: Paired Two Sample for Means

IN ACHIEVEMENTOF RESULTS		
	Education after	*Education b4*
Mean	4.192982456	3.438596491
Variance	0.872807018	1.107769424
Observations	57	57
Hypothesized Mean Difference	0	
df	56	
t Stat	6.863547206	
P(T<=t) one-tail	2.90751E-09	
t Critical one-tail	1.672522303	
P(T<=t) two-tail	5.81502E-09	
t Critical two-tail	2.003240719	

Training and Achievement (Outcomes) Before and After

t-Test: Paired Two Sample for Means

IN ACHIEVEMENTOF RESULTS		
	Training after	*Training b4*
Mean	4.228070175	3.526315789
Variance	0.679197995	1.039473684
Observations	57	57
Hypothesized Mean Difference	0	
df	56	
t Stat	6.274337501	
P(T<=t) one-tail	2.7102E-08	
t Critical one-tail	1.672522303	
P(T<=t) two-tail	5.4204E-08	
t Critical two-tail	2.003240719	

t-Stat is greater than t-Critical. Therefore, we reject the null hypothesis that there is no difference in the mean.