

Meeting Learners' Expectations: A Survey-Based Methodology for Quality Improvement

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Defense Acquisition University



DAU Is

Training the 187,000-strong **Defense Acquisition Workforce**

700 Professionals Supporting the Warfighter

World-wide: Fort Belvoir, VA headquarters with 5 Campuses & 2 Colleges

Courses, consulting, credentials, job tools, performance support, webinars, workshops, events, conferences, partnerships, **research**, journals, community & communications

Chief Learning Officer's Learning Elite: **2017 Top Learning Organization** in the World



Meeting Learners' Expectations: A Survey-based Methodology for Quality Improvement

PANELISTS

Judith Bayliss, PhD

Alicia Sanchez, PhD

Who We Are



Dr. William
Schleckser,
formerly DAU



Dr. Chris Hardy,
DAU

What DAU Does

We ***train*** the Defense Acquisition Workforce:

1. Business and Financial Management
2. Contracting
3. Engineering and Technology Management
4. Logistics and Sustainment
5. Program Management
6. Requirements

187,000+
Learners

DAU Values

Experiences:

- Training built from effective andragogy
- Supported by **current learning science**

Opportunities:

- **Learner-informed** design decisions
- Sound, repeatable methodology

Evidence:

- Institutional **goals met**
- Actionable data for decisions

What We Did

1. Identified a strategically critical question/information need.
2. Determined a survey methodology.
3. Assembled an ad hoc team. **Don't do it that way.**
4. Collected data.
5. Found statistician. **See point 3 again.**
6. Analyzed data.
7. Communicated findings.
8. Defined next steps and resource needs for ongoing research.

Why We Did It

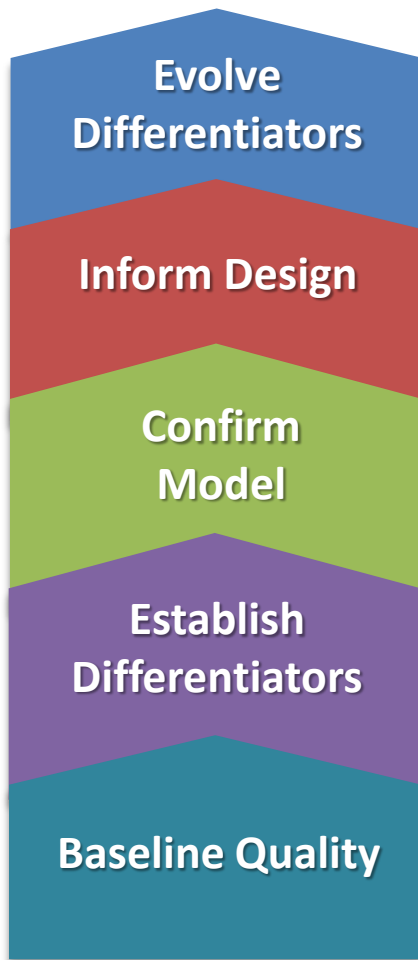
Tested working assumptions about:

- DAU's training products
- Design & quality
- Customers' values & expectations

So DAU can act **with data not supposition.**

Learners Are **CONSUMERS!**





How *IMPRESSED* would you be if
your learning experience were...

1	ENGAGING	7	TEST OUT
2	GAMES AND SIMULATIONS	8	RELEVANCE
3	REAL WORLD EXAMPLES	9	CHOICES
4	WHY IT'S IMPORTANT	10	LEARN BY DOING
5	PRIOR KNOWLEDGE ACCOUNTED	11	MOTIVATING
6	VISUALLY APPEALING	12	EMOTIONALLY COMPELLING

Methodology

Survey Instrument:

- 12 questions
- 7-point Likert scale
- Area reserved for qualitative comments

Sample:

- 736 responses
- 395 comments

Population: **3,000** (DoD Acquisition Community)

What We Found

DAU's customers were:

- Responsive
- Credible
- Consistent in their expectations

Bottom Line: **Valid statistical model** describing **Impressiveness** as a feature of training programs that can serve as guidance for design decisions.

Analysis

Qualitative Analysis

- Comments fractures into themes
- Themes reserved to inform quantitative analysis and model building

Quantitative Analysis

- Descriptive analysis revealed fairly **normal distributions**
- Correlation revealed correlated **relationships among 9 of 12 variables** (3 removed)
- Principal Component Analysis revealed remaining 9 components had communalities of greater than 0.75
- Other findings
 - Latent variable (**Impressiveness**) is **highly unique**
 - Observed variables **very stable with low variability**
 - Biplot provided some proof of this
- Path Analysis (ML) performed in R on model

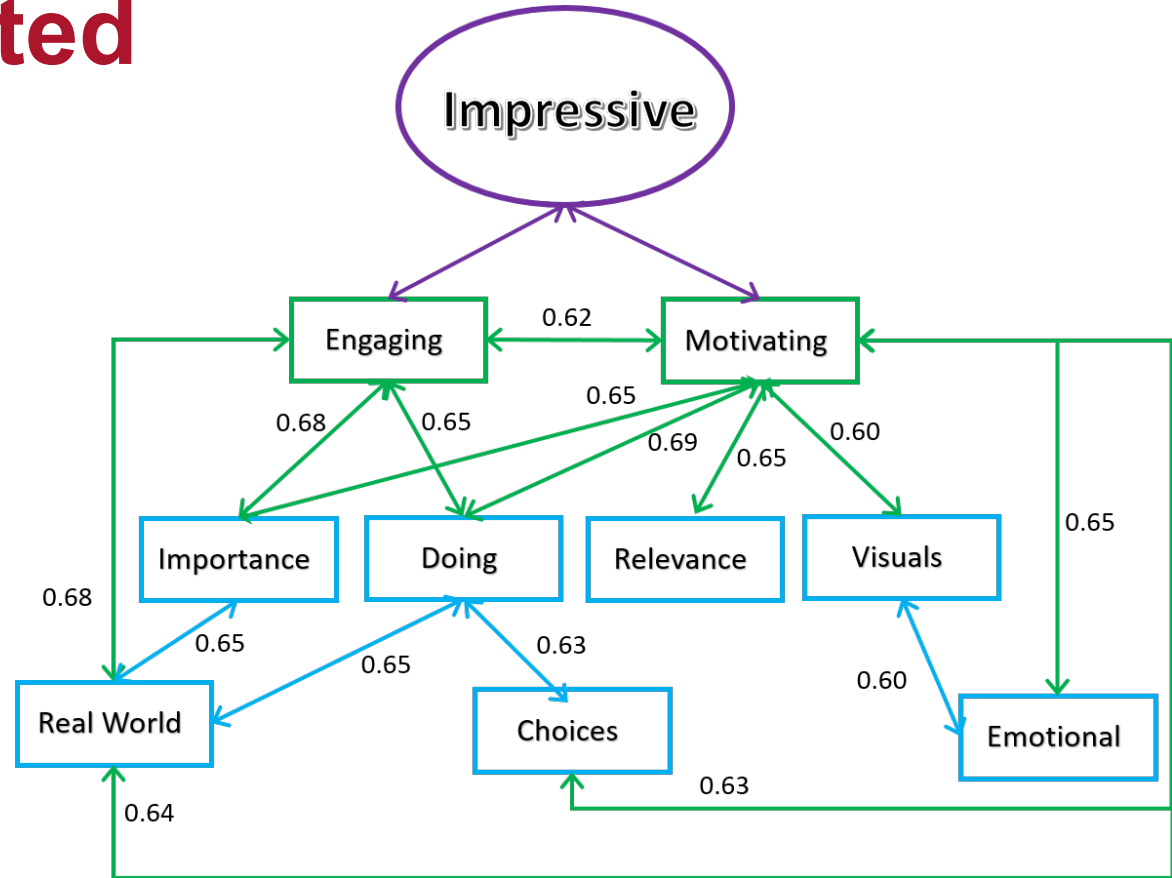
Correlation Matrix

		Correlation Matrix											
		Engage	GSIM	Realworld	WhyImport	PriorKnow	Visual	Testout	Relevant	Choices	Learnbydo	Motivate	Emotional
Correlation	Engage	1.000	.519	.646	.681	.569	.575	.380	.575	.514	.645	.692	.588
	GSIM	.519	1.000	.496	.434	.427	.493	.266	.293	.410	.504	.474	.527
	Realworld	.646	.496	1.000	.646	.523	.539	.434	.564	.511	.608	.636	.501
	WhyImport	.681	.434	.646	1.000	.511	.532	.389	.588	.480	.571	.653	.524
	PriorKnow	.569	.427	.523	.511	1.000	.581	.448	.521	.508	.544	.572	.490
	Visual	.575	.493	.539	.532	.581	1.000	.342	.448	.534	.558	.599	.602
	Testout	.380	.266	.434	.389	.448	.342	1.000	.477	.585	.435	.458	.343
	Relevant	.575	.293	.564	.588	.521	.448	.477	1.000	.577	.555	.652	.427
	Choices	.514	.410	.511	.480	.508	.534	.585	.577	1.000	.633	.632	.479
	Learnbydo	.645	.504	.608	.571	.544	.558	.435	.555	.633	1.000	.693	.523
	Motivate	.692	.474	.636	.653	.572	.599	.458	.652	.632	.693	1.000	.651
	Emotional	.588	.527	.501	.524	.490	.602	.343	.427	.479	.523	.651	1.000

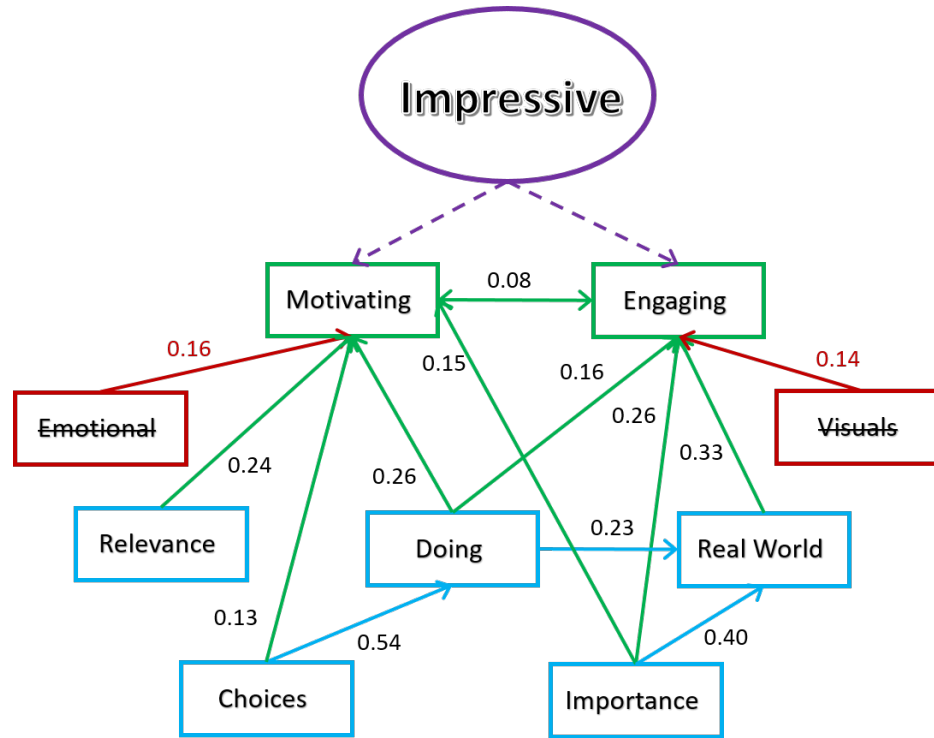
Correlations > 0.60

Correlated Model

Correlations > 0.60



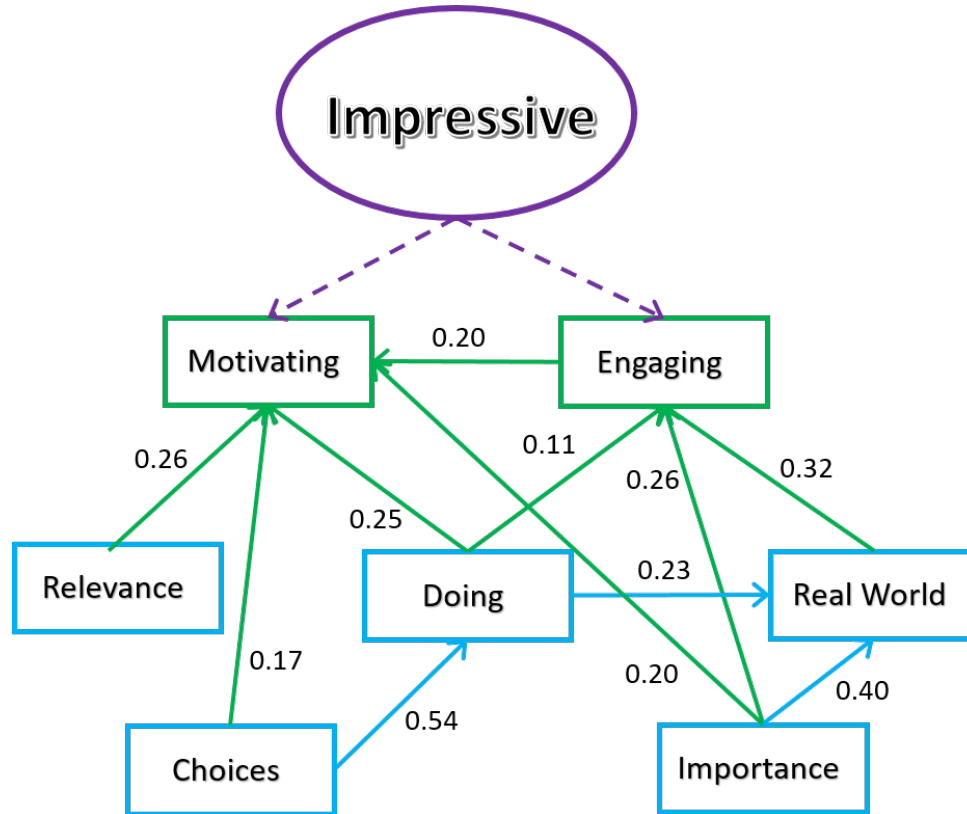
The Initial Model



Regressions:				
	Estimate	Std.Err	z-value	P(> z)
Motivate ~				
MEEmotional	0.163	0.021	7.930	0.000
MRelevant	0.244	0.033	7.460	0.000
MLearnByDo	0.217	0.029	7.507	0.000
EWhyImport	0.151	0.036	4.173	0.000
ERealWorld	0.157	0.040	3.949	0.000
LChoices	0.133	0.030	4.459	0.000
Engage ~				
MLearnByDo	0.158	0.024	6.609	0.000
EWhyImport	0.262	0.032	8.274	0.000
ERealWorld	0.331	0.038	8.785	0.000
MVisual	0.144	0.025	5.871	0.000
ERealWorld ~				
EWhyImport	0.399	0.025	16.088	0.000
MLearnByDo	0.226	0.022	10.481	0.000
MLearnByDo ~				
LChoices	0.536	0.028	19.284	0.000
Covariances:				
	Estimate	Std.Err	z-value	P(> z)
.Motivate ~~				
.Engage	0.077	0.023	3.269	0.001

Model Test Baseline Model:	
Test statistic	2287.314
Degrees of freedom	26
P-value	0.000
User Model versus Baseline Model:	
Comparative Fit Index (CFI)	0.892
Tucker-Lewis Index (TLI)	0.766

Parsimonious Model



Regressions:

	Estimate	Std.Err	z-value	P(> z)
Motivate ~				
MRelevant	0.259	0.034	7.520	0.000
MLearnByDo	0.250	0.030	8.267	0.000
LChoices	0.165	0.031	5.353	0.000
EWhyImport	0.196	0.037	5.335	0.000
ERealWorld	0.199	0.042	4.766	0.000
Engage ~				
EWhyImport	0.235	0.032	7.436	0.000
ERealWorld	0.319	0.038	8.406	0.000
MLearnByDo	0.112	0.026	4.264	0.000
Motivate	0.201	0.031	6.581	0.000
MLearnByDo ~				
LChoices	0.536	0.028	19.284	0.000
ERealWorld ~				
EWhyImport	0.399	0.025	16.088	0.000
MLearnByDo	0.226	0.022	10.481	0.000

Model Test Baseline Model:

Test statistic	2104.751
Degrees of freedom	18
P-value	0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI)	>.93 (Byrne, 1994)	0.935
Tucker-Lewis Index (TLI)		0.806

Standardized Root Mean Square Residual:

SRMR	<.08 (Browne & Cudeck 1993)	0.081
	Close to .08 (Hu & Bentler, 1999)	

There's More to Do

1. What's Left To Do

- Use qualitative data to **identify unknown variables** that affect **Impressiveness**
- **Incorporate** new variables into the model
- Refine existing variables

2. Learning Asset Baseline

- Add “How impressive was this course?” to **end of course survey**
- Rerun Path Analysis to determine course Impressiveness baseline
- Update course, re-survey, rerun analysis, identify changes in Impressiveness

3. Value

- **Quantify effects** of course changes
- Compare course baseline scores
- Identify Impressiveness of combined curriculum
- **Compare and contrast** Impressiveness based on demographics of students
 - What works for whom
 - Identify best global approach

If You Want To, Too

1. Identify a strategically critical question/information need that aligns to an organizational goal.
2. Assemble a team deliberately by identifying and staffing all required contributions: statistician, project manager, stakeholder representative, L&D professional(s), etc.
3. Determine a methodology.
4. Establish a communication plan.
5. Collect data.
6. Analyze data.
7. Communicate findings.
8. Define any next steps.

Q&A

REFERENCE

How *impressed* would you be if your learning experience ...

1. Was *engaging*?
2. Included *games and simulations*?
3. Included *real world examples*?
4. Explained *why it is important* for you to learn this content?
5. Took your *prior knowledge* into account?
6. Was *visually appealing*?
7. Allowed you to *test out* of sections you could demonstrate proficiency in?
8. Was *relevant* to you?
9. Included *choices* of how you received content (i.e., video, audio, experiences)?
10. Allowed you to *learn by doing*?
11. Was *motivating*?
12. Was *emotionally compelling*?

Principal Component Analysis

Component Matrix^a

	Component 1
Engage	.867
Realworld	.796
WhyImport	.800
PriorKnow	.775
Visual	.774
Relevant	.784
Choices	.808
Learnbydo	.848
Motivate	.885
Emotional	.754

Extraction Method:
Principal Component
Analysis.

a. 1 components
extracted.

Communalities >
0.75

A **communality** is the extent to which an item correlates with all other items.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.945 *
Bartlett's Test of Sphericity	Approx. Chi-Square	2570.203
	df	66
	Sig.	.000

* KMO > 0.80 reveals sampling was adequate

KMO measure	Interpretation
KMO ≥ 0.90	Marvelous
0.80 ≤ KMO < 0.90	Meritorious
0.70 ≤ KMO < 0.80	Average
0.60 ≤ KMO < 0.70	Mediocre
0.50 ≤ KMO < 0.60	Terrible
KMO < 0.50	Unacceptable

[KMO and Bartlett's test of sphericity | Analysis INN.](#)

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.498	62.484	62.484	7.498	62.484	62.484
2	.869	7.244	69.728			
3	.656	5.465	75.193			
4	.520	4.335	79.528			
5	.457	3.811	83.339			
6	.445	3.708	87.047			
7	.327	2.723	89.770			
8	.312	2.596	92.366			
9	.293	2.438	94.804			
10	.244	2.035	96.839			
11	.200	1.665	98.504			
12	.179	1.496	100.000			

Extraction Method: Principal Component Analysis.

DAU is a **leader in implementing Kirkpatrick's Four Levels of Evaluation**. Each year DAU collects **hundreds of thousands of evaluations** after training events to determine whether the curriculum and its outcomes were effective.

Example DAU End of Course Business Intelligence Dashboard



- Immediate post-course and 60-day follow-up evaluations are deployed to students, and separate surveys are also deployed to their supervisors.
- Over the years we have received positive student feedback in all Four Levels of Evaluation. The University's customers **consistently give top ratings to DAU's learning assets and the outstanding faculty who deliver them.**
- This study has the potential to take DAU beyond 4 Levels of Kirkpatrick surveys and help us understand how to **Impress** our students with content and delivery.

About DAU

DAU Vision

An accomplished and adaptive workforce, giving the Warfighter a decisive edge.

DAU Mission

Provide a global learning environment to develop qualified acquisition, requirements, and contingency professionals who deliver and sustain effective and affordable warfighting capabilities.

- 10 U.S. Code Section 1746 – Defense Acquisition University
- 1992 – Doors opened