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Perceived Transfer of Basic Combat Skills Training in the US Air Force

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Introduction

In early 2003, during Operations Enduring Freedom and Iraqi Freedom, many airmen, including those in certain support career fields, were deployed to hostile environments such as Afghanistan and Iraq. Deployments of this nature were a departure from normal Air Force operations where support personnel were normally far from the front lines of battle,¹ thus placing support airmen, especially those in logistics related career fields, at greater direct risk of participating in tactical ground operations.²

According to Major Barry Lineback,³ “The battlefield makes rigorous physical, psychological, and moral demands that require both tangible and intangible qualities.” Defining and studying these *tangible and intangible qualities* are important since the use of combat skills by logistics personnel is becoming increasingly necessary. A Headquarters Air Force coordinated white paper entitled, *Long-Term Integration of Expeditionary Airmen Concepts into the Air Force*, questioned whether the Air Force is effectively indoctrinating, training, educating, and sustaining combat readiness [for all support airmen] over the entire course of their career.⁴ To address these issues, the Expeditionary Combat Airmen Integrated Process Team (ECA IPT) was created by the Directorate of Security Forces and Force Protection.⁵ According to a draft charter for the ECA IPT, the purpose of the IPT was to “... provide direction to determine current combat skills for the ECA, current training support, the *training gap*, and recommend training and education to close the gap.”⁶

Article Acronyms

AFI – Air Force Instruction
AFMAN – Air Force Manual
AT/FP – Antiterrorism/Force Protection
ECA IPT – Expeditionary Combat Airmen Integrated Process Team
ISD – Instructional Systems Development
LOAC – Law of Armed Conflict
MD – Mean Difference
ORE – Operational Readiness Exercise
ORI – Operational Readiness Inspection
SABC – Self-Aid Buddy Care

To date, there has been little research to guide the development of a formal Air Force basic combat skills training program or to address the factors affecting the transfer of those skills from the classroom to the battlefield. To address this deficit, we conducted a study to provide a working operational definition of Air Force basic combat skills and to determine the perceptions of support airmen and their ability to transfer skills from the classroom to the battlefield. Evaluating training in terms of actual results and behavior change is crucial because training basic combat skills is a multifaceted and complex task. As such, this study analyzed those factors that affected the transfer of five specific basic combat skills.

Review of Literature

Training

Training has been defined as a planned learning experience designed to bring about a permanent change in an individual’s knowledge, attitudes, or skills⁷ as cited in Noe.⁸ Only recently have organizations begun to recognize that the knowledge base of their employees can be a key source of sustainable competitive advantage.⁹ As examples, civilian corporations reportedly spent over \$80B on formal training programs in 2004,¹⁰ while the Air Force planned to spend over \$9M in basic combat convoy training alone in 2005.¹¹ Additionally, new technology creates an increasingly globalized work environment, adding new pressures to improve the quality of services and products to stay competitive.¹² Training has been an essential part of both civilian¹³ and military organizations throughout the 20th and early 21st centuries.¹⁴

Training Evaluation: Training Effectiveness versus Training Transfer

Training evaluation can be defined as a “systematic collection of descriptive and judgmental information necessary to make efficient training decisions related to the selection, adoption, value, and modification of various instructional activities.”¹⁵ In 1958 and 1959, D. L. Kirkpatrick released a series of four articles describing his hierarchical model for evaluating training programs.¹⁶ Kirkpatrick’s original model included the following:

- **Reaction.** How well the trainee liked the training program.

| Training Type | Reference | Nomenclature |
|---------------------------------|------------------------|---|
| Anti-terrorism/Force Protection | AFMAN 10-100 | Airman's Manual |
| | AFI 10-245 | Air Force Anti-terrorism Standards |
| | AFI 31-301 | Air Base Defense |
| Self-Aid/Buddy Care | AFMAN 10-100 | Airman's Manual |
| | AFI 36-2238 | Self-Aid Buddy Care Core Training |
| Chemical Warfare | AFMAN 10-100 | Airman's Manual |
| Law of Armed Conflict | AFMAN 10-2602 | Nuclear, Biological, Chemical, and Conventional (NBCC) Operations and Standards |
| | AFMAN 10-100 | Airman's Manual |
| Weapons Training | AFI 51-401 | Training and Reporting to Ensure Compliance with the Law of Armed Conflict |
| | AFMAN 10-100 | Airman's Manual |
| Weapons Training | AFI 31-207 | Arming and Use of Force by Air Force Personnel |
| | AFMAN 36-2227 (Vol. 1) | Combat Arms Training Program |
| | AFI 36-2226 | Combat Arms Program |

Table 1. Air Force Instruction References for Combat Skills

- **Learning.** The knowledge acquired, skills improved, or attitudes changed as a result of training.
- **Behavior.** Using those facts and skills learned on the job.
- **Result.** Outcomes that appear on the job as a result of training¹⁷

Kirkpatrick's model has been the foundational work used by many researchers in training evaluation studies.¹⁸ However, Kirkpatrick's model included three key assumptions:

- Arranging the hierarchical levels in increasing order of value (Reaction → Learning → Behavior → Results)
- Causally linking the levels
- Positively correlating the levels¹⁹

Because of these assumptions, many researchers question the validity of Kirkpatrick's model in accurately evaluating training programs. According to Alliger, Bennett, and Tannenbaum,²⁰ using Kirkpatrick's model as the standard for training evaluation could actually hinder future research and growth in this arena by suppressing the development of new theories in training research.

Researchers have attempted to overcome the shortfalls within the Kirkpatrick model by suggesting new models and researching other variables thought to be key factors in the training process.²¹ Noe, though using Kirkpatrick's model as a framework for his study, suggested there were also motivational and situational factors involved in the training process.²² Alliger and Janek suggested expanding the Kirkpatrick model to capture behavioral data from trainees, subordinates, coworkers, and supervisors.²³ Kraiger, Ford, and Salas noted that variables such as organizational commitment and its effect on learning have largely been ignored.²⁴ Facticeau et al²⁵ attempted to measure training success by using a model that subsequently showed a significant link between pretraining motivation and perceived training transfer. Alliger et al²⁶ expanded Kirkpatrick's reactions level to include affective and utility reactions and demonstrated a significant link between utility reactions and job performance. Development of new models and ideas has resulted in training evaluation research that has become more complex in determining training effectiveness.

One such method used in literature for determining training effectiveness is measuring training transfer. Training transfer can

be defined as the ability to apply what one has learned from training back to one's job.²⁷ The constructs of training effectiveness and training transfer are linked in several studies.²⁸

When evaluating training, many models use training transfer in combination with other constructs such as pretraining motivation, tests scores from evaluations given at the time of training, and job evaluations scores, to assess training effectiveness.²⁹ According to Hobbs,³⁰ studies which use the terms training transfer and training effectiveness interchangeably were less common.³¹ One study by Gist, Bavetta, and Stevens³² suggested

training transfer was directly linked to perceptions of training effectiveness. This study found that MBA students with higher perceptions of training transfer were more likely to rate their training as effective.³³

Perceived Training Transfer

The Baldwin and Ford³⁴ review of training literature identified three general factors affecting the transfer process and gave future transfer research a clear roadmap. The three factors were trainee characteristics, training design, and work environment. Trainee characteristics consisted of personality, motivation, and ability factors.³⁵ Training design characteristics incorporated principles of learning,³⁶ sequencing of training,³⁷ and training content.³⁸ Work environment characteristics consisted of support and opportunity to use.³⁹

Training transfer research is a critical area for training evaluation. Some examples of general types of training studied in transfer research following the Baldwin and Ford study include the study of management training;⁴⁰ computer training;⁴¹ and technical or occupational skills training.⁴² Each of these studies highlighted possibilities for new relationships with training transfer. In the same manner, basic combat skills are a diverse construct consisting of the five separate combat skills. Analysis of components of the combat skills construct may provide some unique insight into the factors affecting combat skills as a whole. As such, the following hypothesis will be tested:

Hypothesis: Perceptions of perceived training transfer will differ with respect to training type.

Method

The first step was to examine Air Force policy to determine what specific knowledge or set of skills all Air Force personnel should possess in order to survive and operate in hostile environments. Commanders determine deployment eligibility using Air Force Instruction (AFI) 10-401, *Air Force Operations Planning and Execution*⁴³ and AFI 10-403, *Deployment Planning and Execution*.⁴⁴ These and other written policies include five requirements for basic deployment eligibility and associated time frames for required training. The five basic requirements for deployment eligibility are as follows:

- Primary duty weapon training
- Law of armed conflict (LOAC) training
- Self-aid buddy care (SABC) training
- Chemical warfare defense training
- Antiterrorism and force protection level I (AT/FP) training⁴⁵

These five requirements were used to operationally define *basic combat skills* in an Air Force context. Each of the skills and appropriate AFI references are listed in Table 1. We recognize in the current Air Force environment there are now more options available for combat skills training; however, at the time of this research, these options were not available.

Instrument Development

A Web-based survey was used to assess support personnel perceptions of combat skills training received. The targeted population was active duty support Air Force officer and enlisted personnel from multiple career fields. A stratified, random sample from each of the targeted career fields was taken to produce a representative sample with a confidence level of $\alpha = .05$.⁴⁶ The Air Force Personnel Center Survey Branch⁴⁷ provided a listing of 6,374 names, and a 34 percent response rate resulted ($n=2,168$).

In order to test perceived training transfer of basic combat skills as a single construct, a survey of the training attitudes of the five distinct skills was necessary. A separate 59-item survey was designed for each of the five basic combat skills, with each survey being identical in wording with the exception of the training type (for example, weapons training, chemical warfare training). Respondents were randomly assigned to a specific combat skill group and asked to answer 32 items regarding only that one skill, 13 demographic items, and 2 optional demographic items.

All items used a 5-point, Likert-type response format, ranging from *strongly disagree* (1) to *strongly agree* (5), with *neutral* (3) as the midpoint. Sample demographics included such items as gender, career fields, and rank. The yes/no items allowed survey participants to identify any prior combat skills training received as well as any recommendations for additions to the Air Force basic combat skill requirements. See McCraine⁴⁸ for details on survey development, pretesting and pilot testing, and nonresponse bias.

Respondent Demographics

The sample respondent demographics were comparable to the overall Air Force population for the selected career fields. The average age of sample participants (34 and 30 years for officers and enlisted, respectively) was consistent with the overall population demographics (35 and 29 years for officers and enlisted, respectively).⁴⁹ Gender statistics for the career fields used in this study had a mix of 78.6 percent male and 21.4 percent female Air Force-wide,⁵⁰ while the respondents in this study were 77.1 percent male and 22.9 percent female. The rank distribution of the original 6,370 potential respondents was known, and this information allowed a detailed comparison of the actual respondents with the original sample. Few differences between the original sample and the respondent population were noted regarding rank. The respondent population was comprised of 59 percent officers, while the initial sample contained approximately 61 percent officers. Interestingly, the respondent

population had no responses from airmen (E-1) even though the original sample included 64 E-1s.

Measures

Perceived Training Transfer

Perceived training transfer was assessed with a four-item scale previously used by Hobbs⁵¹ and based upon a review by Facticeau et al⁵² of the relevant literature.⁵³ Facticeau et al⁵⁴ and Hobbs⁵⁵ reported internal consistency coefficients of $\alpha = .87$ and $.92$ for civilian and military samples, respectively. The reported internal consistency coefficient for this study was $\alpha = .72$ ($n = 932$). The scale mean and standard deviation were 3.42 and $.22$, respectively.

Deployment Experience

Deployment experience was measured with one item. The response range was comprised of five possible responses, with anchors of “0-1” and “8+” deployments.

Results

The purpose of our research was to determine if the reported perceptions of training transfer would differ by individual training type. This question was analyzed using ANOVA (Analysis of Variance Between Groups) and results indicate partial support ($F(4,927) = 6.22, p < .01$). When grouped by

| Code | Specialty |
|------|------------------------|
| 1N | Intelligence |
| 2F | Fuels |
| 2G | Logistics Plans |
| 2S | Supply |
| 2T | Transportation |
| 3C | Communications |
| 3E | Engineering |
| 3M | Services |
| 3P | Security Forces |
| 3S | Personnel |
| 5J | Paralegal |
| 5R | Chaplain Assistant |
| 6C | Contracting |
| 6F | Finance |
| 7S | Special Investigations |

Table 2. Air Force Enlisted Career Fields Surveyed

| Code | Specialty |
|------|------------------------|
| 14N | Intelligence |
| 15W | Weather |
| 21A | Aircraft Maintenance |
| 21M | Missile Maintenance |
| 21R | Logistics Readiness |
| 31P | Security Forces |
| 32E | Engineer |
| 33S | Communications |
| 34M | Manpower |
| 35B | Band |
| 35P | Services |
| 36P | Personnel |
| 51J | Judge Advocate |
| 52R | Chaplain |
| 64P | Contracting |
| 65F | Finance |
| 71S | Special Investigations |

Table 3. Air Force Officer Career Fields Surveyed

training type, results indicated perceptions of training transfer had unequal variances between the groups (Levene's Test Statistic = 10.08, $df = 4,927$, $p < .01$), so specific post hoc tests were needed to control for this assumption. The Games-Howell test is one such post-hoc test appropriate for use in large samples where the assumption of homogeneity of variances is violated.⁵⁶ The Games-Howell test was used to determine between which groups the perceptions of transfer were different (see Table 4).

Post hoc testing of the mean perceived training transfer responses described the differences between the training types (see Table 5 and Figure 1). A significant mean difference (MD) (MD = 0.21, $p < .03$) between perceptions of transfer in AT/FP ($M = 3.39$, $SD = 0.71$) and chemical warfare training ($M = 3.60$, $SD = 0.61$) as well as a significant difference in means (MD = 0.34, $p < .01$) between chemical warfare training and weapons training ($M = 3.26$, $SD = 0.80$) resulted. No other significant differences were found between training types.

Comparison of Training Types

The objective of this study was to determine if the reported perceptions of training transfer differ by individual training type. Using analysis of variance and specific post hoc tests, three groups

of training types were found to be significantly different. Respondents taking the chemical warfare training survey reported the highest perceived training transfer and were significantly different from both weapons training (the lowest perceived training transfer response) and AT/FP training. This could be due to several factors. Respondents were only asked about attitudes about the formal training class without respect to practical experience. However, many respondents may have allowed their experiences and practice in chemical warfare training during operational readiness inspections (ORI) and exercises (ORE) to bias their responses which may explain the difference between weapons training and chemical warfare training. During ORIs and OREs, both chemical warfare skills and AT/FP skills are tested in a realistic environment. This explanation alone does not explain the difference between chemical warfare training and AT/FP training. Another possible explanation could be simply the way the training is presented. Unlike AT/FP, chemical warfare training is taught using multiple methods. There is normally a classroom lecture component, sometimes a video component, and in most cases, participants actually have to don the full chemical ensemble.

In addition to the quantitative analysis, respondents'

qualitative inputs were valuable in understanding research results. Many respondents (56 percent) provided comments regarding what should be considered a basic combat skill—common themes emerged.

Enhanced Primary Duty Weapons Training

Respondents did not believe this training was offered frequently enough. Other respondents noted that the weapons training Air Force members currently receive did not align with actual situations faced while deployed. Comments indicated that learning how to shoot and move were vital skills not currently being taught. Two examples are:

Current training only addresses how the weapon works and how to aim/fire but doesn't address situations where airmen might be forced to use weapons in combat zones....

M-16 and M-9 training, all ranks, once a year, include moving targets.

Joint Focused Training

Respondents suggested all airmen should learn to be infantrymen first like their Army and Marine Corps counterparts. Others took a more moderate approach and suggested airmen need to have a better conceptual view of the different

| Training Comparisons | | MD | Std Error | Sig |
|-------------------------------------|-------------------------------------|---------|-----------|-----|
| Anti-Terrorism/ Force Protection | Self-Aid Buddy Care | -.04 | .07 | .99 |
| | Chemical Warfare | -.21(*) | .07 | .03 |
| | Law of Armed Conflict | -.05 | .07 | .95 |
| | Weapons | .13 | .08 | .47 |
| Self-Aid Buddy Care | Anti-Terrorism/ Force Protection | .04 | .07 | .99 |
| | Chemical Warfare | -.17 | .06 | .06 |
| | Law of Armed Conflict | -.02 | .06 | .99 |
| | Weapons | .17 | .07 | .16 |
| Chemical Warfare | Anti-Terrorism/ Force Protection | .21(*) | .07 | .03 |
| | Self-Aid Buddy Care | .17 | .06 | .06 |
| | Law of Armed Conflict | .16 | .06 | .10 |
| | Weapons | .34(*) | .07 | .01 |
| Law of Armed Conflict | Anti-Terrorism/ Force Protection | .05 | .07 | .94 |
| | Self-Aid Buddy Care | .02 | .06 | .99 |
| | Chemical Warfare | -.16 | .06 | .10 |
| | Weapons | .18 | .07 | .09 |
| Weapons | Anti-Terrorism/ Force Protection | -.13 | .08 | .47 |
| | Self-Aid Buddy Care | -.16 | .07 | .16 |
| | Chemical Warfare | -.34(*) | .07 | .01 |
| | Law of Armed Conflict | -.18 | .07 | .09 |

* The mean difference is significant at the .05 level.

Table 4. Games-Howell Post Hoc Results for Perceived Training Transfer

| | N | M | SD | Range | 95% Confidence Interval for Mean | |
|--------------------------------|-----|------|------|-------|----------------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| Antiterrorism/Force Protection | 172 | 3.39 | 0.71 | 1-5 | 3.28 | 3.50 |
| Self-Aid Buddy Care | 204 | 3.43 | 0.65 | 1-5 | 3.33 | 3.52 |
| Chemical Warfare | 189 | 3.60 | 0.61 | 1-5 | 3.51 | 3.69 |
| Law of Armed Conflict | 174 | 3.44 | 0.58 | 1-5 | 3.36 | 3.53 |
| Weapons Training | 193 | 3.26 | 0.80 | 1-5 | 3.14 | 3.37 |
| Total | 932 | 3.42 | 0.68 | 1-5 | 3.38 | 3.47 |

Table 5. Descriptive Statistics for Perceived Transfer by Training Type (n=932)

Services and how they work together.

As we continue to shape our forces we also continue to deploy into Joint environments; therefore, our focus should lend [sic] some way of integrating and/or increasing contingency skills training with other military components.

More Joint combat training based on deployment with Joint Services.

Survival Training

The topic of survival training spanned a much broader scope than simple attendance at the Air Force Survival School at Fairchild Air Force Base. Several respondents felt this should be a required course for all airmen regardless of Air Force specialty code. Others supported the current structure with more opportunities for those deploying to hostile areas to attend the survival school. In addition to formal survival training, several participants recommended all airmen be taught basic hand-to-hand combat skills (such as rifle fighting, knife fighting, and unarmed defense such as martial arts) as well as critical language training.

Recognition techniques to tell the difference between friendly and hostile foreign nationals. Realistic survival/resistance training for everyone (not just aircrew).

... survival training for multiple environments.

Relevant Material

Numerous participants in the study lamented that current weapons training is not relevant to potential deployed environments and locations. AT/FP training was said to be relevant for temporary duty assignments to places like Thailand, but not to hostile areas like Iraq. SABC was also thought to be inadequate for use in a hostile environment. Several respondents suggested a course similar to the Army's Combat Life Saver be incorporated into Air Force basic combat skills training.

More hands-on training and in mock hostile environment

... intensive courses in ... air base defense tactics and small arms tactics would be highly beneficial in deployed environments.

Hands-on Training

Comments also focused on training delivery methods. Many simply said computer based training was not enough. Others noted that computer based training with hands-on experience would be better. Some respondents had never had any hands-on combat skills training in chemical warfare or weapons training. In addition, several respondents commented that Air Force personnel should *train like they fight* by implementing more realistic scenarios.

... Apply the skills rather than just read them during computer-based training or talking about them in classroom/seminar.

We need more hands-on weapons training and role playing in a combat environment that will involve war games with these situations with LOAC integrated in them to help prepare us.

Team Training

Respondents who discussed team training noted two primary issues. First, several participants recommended using teams to conduct weapons training. Learning how to move in teams while under fire was also mentioned. In addition, general training in

teamwork, group dynamics, and small group leadership were also listed as possible candidates to be added to the basic combat skills list.

Internal base defense, small team tactics, fire and maneuver, maneuver under fire, enhanced small-arms firing practice, threat recognition and reporting

Real distance firing, squad/fire team based integrated fire exercises, basic urban

[I] believe every airman and infantryman (like Marines/Army) need basic infantry skills, individual and team methods, basic air base defense.

Conclusions

The Air Force currently has no standard definition of what constitutes *basic combat skills*.⁵⁷ The most comprehensive guide to the Air Force combat skills program would have to be Air Force Manual (AFMAN) 10-100, *The Airman's Manual*.⁵⁸ Based on the responses to the open ended items of the survey, the *Airman's Manual* falls short of clearly defining the skills and knowledge one would need to have to effectively operate in a hostile environment. The *Airman's Manual* leaves out some of the skills and knowledge Air Force members consider important such as movement with weapons and small group leadership. Perhaps the Air Force should consider revising the manual to more closely align to the Army's *Soldier's Manual of Common Tasks*.⁵⁹ This regulation contains all basic combat skills required to be an Army soldier, regardless of military occupational specialty, and requires all soldiers be certified in each skill prior to graduation of basic training. In addition, detailed instructions of how to complete each task are provided.

Another concern with current Air Force combat skills training is the lack of a single organization responsible for training and guidance. The Air Force currently relies on numerous AFIs, headquarters directives, major command directives, base-level leadership, base and unit deployment manager interpretations, and to a great extent, locally developed training. To complicate matters further, the AFIs that define our basic combat skills come from four separate instruction series—security forces, personnel, operations, and civil engineering. Perhaps a single AFI listing all the basic combat skills could be drafted, and a single organization should be responsible for maintaining its currency. Since relevant training is the key, one recommendation is that Air Education and Training Command be responsible for analyzing, designing, developing, and implementing a unified combat skills training curriculum.

Central oversight of all training programs might lead to the use of the Instructional System Development (ISD) model which is set forth in AFMAN 36-2234, *Instructional System Development*⁶⁰ and used in most Air Force training programs. The ISD allows training programs (for example, Basic Communications Officer Training, Basic Logistics Readiness Officer Training, Basic Military Training) to follow a rigorous educational analysis, design, development, and implementation process. One key factor in this program is that recurring training evaluation is at the heart of the model and is a continuous process throughout each phase.

The driving question in this research, “Are Air Force airmen ready to survive in hostile or direct threat environments?” was asked by former Chief of Staff of the Air Force, General John J. Jumper.⁶¹ Although 70 percent of respondents were neutral in their sense of perceived training transfer, it appears Air Force personnel in general are more comfortable with using chemical warfare skills than any other type of combat skill. In contrast, it appears Air Force personnel are least comfortable utilizing their primary duty weapons in a hostile environment.

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