HumRRO®

THE FIRST 75 YEARS



1951–2026

Celebrating Our

75th Anniversary

A special edition HumRRO publication, written by
Peter F. Ramsberger, edited by Adrienne Fox Luscombe,
and designed by Rae Powell. Limited copies are available.
Credit is given for photographs from the archives when the origin
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HumRRO
HUMAN RESOURCES RESEARCH ORGANIZATION

THE FIRST 75 YEARS

Written by
Peter F. Ramsberger

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FOREWORD

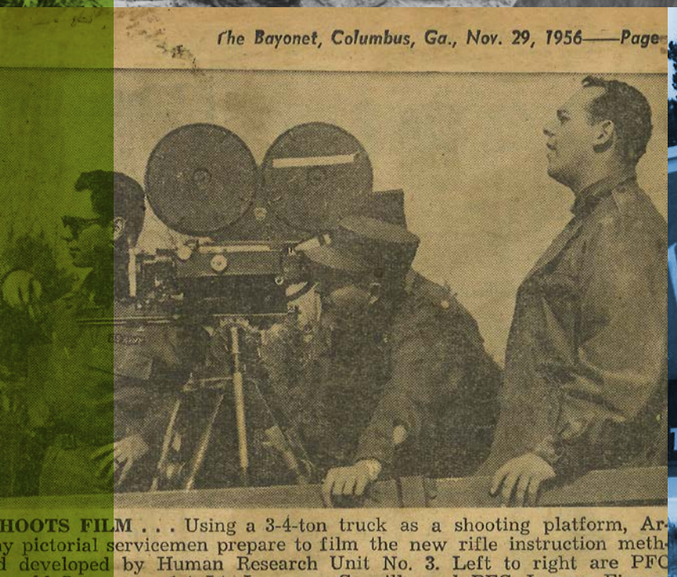
THE OCCASION OF HumRRO's 75TH ANNIVERSARY seemed an appropriate time to update the history written 25 years ago when the company reached its 50th year. As was true then, certain parameters had to be established regarding what to include or omit. For instance, like many companies, HumRRO had a penchant for reorganizing. Detailing each of these moves would have been a laborious process which, frankly, would not have been particularly interesting to most readers. The process of selecting projects to be included in the history was difficult; there were literally thousands to choose from. Generally, we opted for those that were particularly interesting, had an especially significant impact, or were highly representative of the type of work HumRRO staff was involved with at the time.

Many thanks to HumRRO leadership for providing the resources needed to complete this retrospective. In addition, there were many people who contributed by reviewing drafts and/or providing corrections or rewrites. And finally, sincere thanks to Rae Powell for her hard work and expertise in formatting the volume so beautifully and creatively.

As the pages that follow attest, it has been a productive, sometimes turbulent, and interesting 75 years. Happy birthday HumRRO, and many happy returns.

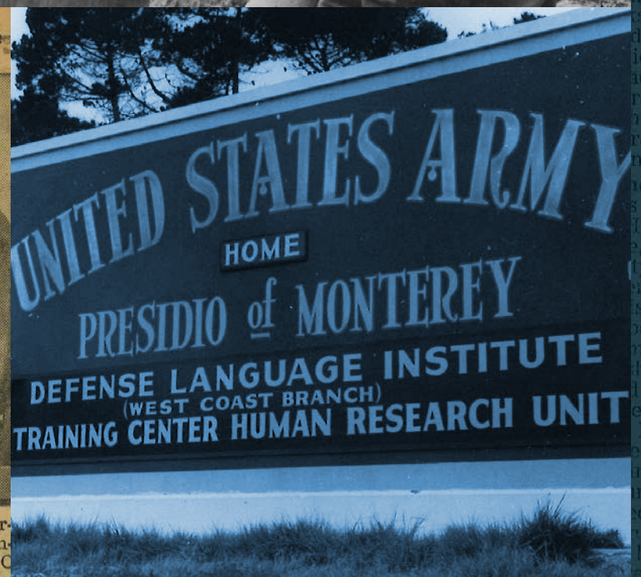
Peter Ramsberger, Ph.D.
Principal Scientist and HumRRO Historian
Retired after 47 years at HumRRO





The Bayonet, Columbus, Ga., Nov. 29, 1956——Page

HOOTS FILM . . . Using a 3-4-ton truck as a shooting platform, Ar-
y pictorial servicemen prepare to film the new rifle instruction meth-
d developed by Human Research Unit No. 3. Left to right are PFC



BOISE, IDAHO, THURSDAY MORNING, FEBRUARY 14,

aho Man Writes Note to Ike, ow He's Aiding Arms Study

he sight, trigger and stock modern rifle are essential- ne same as those designed he medieval crossbow used ie Crusades against the in- 600 years ago, and these features should be re- uated for the needs of mod- warfare," says the newest member of the U. S. y Infantry Human Re- h unit at Fort Benning, Howard C. Sarvis of New lows, Idaho.

other idea of Sarvis' con- ng shooting made an im- nt contribution to the y's development of a new oach to rifle marksman- training. (Trainfire).

rvis wrote a letter to P Eisenhower in June, 1953, h analyzed causes for poor smanship and offered a d solution for improving idual shooting. His views ie problem concurred with results of combat studies is solution triggered pend- research and development n to correct this deficiency.

nds Conference

s letter was forwarded to Human Resources Research , George Washington uni- ty, for consideration. A rence was called which s was asked to attend in er, 1953, after which he me a consultant on marks- hip matters. The project, d Trainfire, was assigned e Human Research unit at Benning, for research.

e Sarvis idea, used as a ng point, was developed nit scientists who inter- d combat veterans for in- tion concerning combat ksmanship problems. s were built which re-

ty of the nation may be endan- gered by continuance of accept- ed ways of thinking about marksmanship and weapons," says Sarvis who envisions ri- flemen as field technicians used only to fire accurately on dis- persed key enemy targets not routinely covered by mass fire power weapons.

Runs Hunting Camp

Operating a hunting camp in Idaho, Sarvis had much leisure to think it out, and his original devises, ideas and weapons. He devel- derstood common to the hunter and the shooting ideas adaptable for field use.

Among his recent contribu- tions a sniper gunsight prove many times more effec- tive than a pistol for close-in fighting, and a new combat gunsight, the X-spot sight, which the Army has directed be tested for possible replace- ment of the target peep-sight now used on the M-1 rifle.

"If the peep-sight is to be kept on the M-1, a simple modi- fication should be made and an easier teaching method for re- cruits devised," says Sarvis.

At present Sarvis is working on a teachable firing technique which he believes would great- ly expedite the training in arms of new recruits in the event a national emergency de- manded such rapid training. The technique essentially con- sists of rhythm exercises in bringing the rifle to bear on a target as well as instantaneous firing.



HOWARD C. Sarvis, New Meadows, above, is the newest staff member of the U. S. Army Infantry Human Research Unit at Fort Benning, Ga.

a balanced team of experts working together to simplify one of the most difficult tasks mankind confronts, the infan- tryman's combat role. If we can make this task simpler we can save American lives."

Sarvis, not a university grad- uate, is primarily an original thinker, inventor and idea man.

Agrarian Club to Hear Talk by Elvon Hampton

Elvon Hampton, speaker o the House of Representatives will be the speaker at a lunc eon of the Ada County Agrarian club Saturday noon at th manuel Lutheran church. S

HumRRO THROUGH THE DECADES

CHAPTER 1.

1951—1960





Top: Staughton Hall was HumRRO's first headquarters building. Right: Air Defense Human Research Unit, Fort Bliss, Texas.



Bottom left: Infantry Human Research Unit, Fort Benning, Georgia.

IN THE BEGINNING...

IN THE YEARS IMMEDIATELY PRIOR TO 1951, U.S. Army staff considered various means for integrating, strengthening, and expanding existing research in the behavioral and social sciences. Such efforts included the formation of a study group led by Colonel Lew Griffing and Dr. Harry Harlow to review the Army's need for human factors and related research. (Harlow is best known for his work on learning and attachment, conducted largely with monkeys.) Following these efforts, the Research and Development Board of the Office of the Secretary of Defense established a Committee on Human Resources. Members of this group included H. E. Brogden, E. A. Rundquist, and J. E. Uhlaner. The Under Secretary of the Army approved a staff study entitled *An Integrated Program in Human Resources Research* on June 21, 1951. One of the recommendations made was that "a major contract be awarded to a recognized educational institution to provide for the formation of a Human Resources Research Office, which would have primary responsibility for conducting research in the areas of training methods, motivation and morale, and psychological warfare techniques." The committee suggested that such activities be coordinated through a central office, with units established at appropriate military installations.

The Department of the Army awarded such a contract to the George Washington University on July 27, 1951. Six days later, on August 2, 1951, the Human Resources Research Office (HumRRO) was opened on the campus of GWU, with Meredith Crawford as its first director and employee. On September 12, HumRRO received its first assignment, which was to plan and coordinate research investigating the psychological impacts of atomic explosions (see *Soldier Reactions to Witnessing a Nuclear Test* on page 8).

The first formal HumRRO staff conference was held on September 24, 1951. Among those in attendance were Dr. Crawford, Harry W. Braun, James, S. Goffard, and Marian Yarrow.

HumRRO's earliest days were taken up with finding staff to carry out its mission. Dr. Crawford spent time wrapping up his responsibilities at his former place of employment, Vanderbilt University, while also trying to recruit new employees. One of the first was John L. Finan of Oberlin College, who also functioned as a consultant to the Human Resources Section, Department of the Army. He was named director of the Motivation, Morale, and Leadership (MML) work unit. Others who signed on during this period included Dr. Henry J. Schroeder, and Dr. Launor Carter of the University of Rochester. Crawford and Harlow visited Northwestern University, the University of Chicago, Ohio State University, UCLA, USC, and the University of Wisconsin, among other academic centers, in search of additional staff. Interviews were conducted at that year's American Psychological Association conference in Chicago. Office space and furniture also had to be arranged, as did the collection of relevant research reports, books, and journals to establish a library.



Dr. Harry Harlow.

HumRRO's first two field research units were opened quickly: the Armor Human Research Unit (HRU) at Fort Knox, Kentucky and the Recruit Training HRU at Fort Ord, California. By this time, the Motivation, Morale, and Leadership (MM&L) and PsyWar Divisions were active at the headquarters site in Washington, D.C. The former had already collected data at Desert Rock and conducted a study of changes in student motivation at the Army's Signal School. By the end of 1952, the HumRRO mission was formally established through Army Regulation 70-25:

> *The mission of the Human Resources Research Office is to conduct such analytical surveys, studies, and research projects as will support the Human Resources Research Program of the Department of the Army with the objective of providing commanders and staff agencies of the Army with scientific bases for the more effective utilization of personnel. The scope of this mission includes research on training and training methods; research on motivation, morale, and leadership; research on nonmaterial aspects of psychological warfare and intelligence operations; and such other Human Resources Research projects as may be assigned by appropriate authorities.*

Subsequent research units were established at Fort Benning in November of 1953, Fort Bliss in December of 1955, and Fort Rucker in October 1958. During this time, HumRRO evolved in other ways.

As early as 1954, questions were being raised as to HumRRO's contribution to the Army's effectiveness. In May of that year, consideration was being given on several fronts to the shutting down of the field units. At that time a committee was formed to review the Human Research Program, with particular focus on duplication of efforts between HumRRO and other agencies (e.g., Operations Research Office).

In 1955 the Army Advisory Committee for the Human Resources Research Office was formed. Its purpose was to advise the Army's Chief of Research and Development on matters concerning the work program, budgets, and general policies of HumRRO. They were charged with reviewing:

- Whether research requirements of the Army were being met,
- The priorities assigned to various projects,
- The adequacy and appropriateness of budgets, and
- General policy guidelines.

The committee was chaired by Harry Harlow and included representatives of the National Academy of Sciences and the Sage and Rockefeller Foundations. They submitted their first report to Secretary of the Army Robert T. Stevens on March 16, 1955. It said, in part:

> *The Army's Human Resources Research Office has become a broad and effective research agency during the few years of its existence. Substantial progress toward a comprehensive research program aimed at improving the efficiency of the fighting man and his man-equipment operations has been achieved. We believe that the program is already more than paying its way and that we can now identify with confidence those directions in which the program should go to insure maximal gain to the Army.*
>
> *In our visits to various Army installations, we found better acceptance, understanding and appreciation of human resources research on the part of operational personnel than we had anticipated, and we are convinced that this results from recognition of recent important research contributions.*

Next page, top right: HumRRO's first contract was for 18 months and $500,000.
Bottom left: LTC Lyman H. Clark, Chief of Infantry, HRU. Dr. Carl J. Lange, D/R, Div. No. 4.
Bottom right: Dr. Meredith Crawford with military visitors to HumRRO's leadership human research unit, Fort Ord, California.

The committee had several recommendations for the restructuring of HumRRO. Perhaps the most significant of these led in June of 1960 to the shutting down of the PsyWar division, which was replaced by the Special Operations Research Office at The American University in Washington, D.C.

By the end of its first decade, HumRRO had almost 200 research and some 70 support and administrative staff personnel organized into six divisions and research units:

Training Methods Division	Washington, D.C.	Dr. A. J. Hoehn
Armor Human Research Unit	Fort Knox, KY	Dr. N. W. Willard
Leadership Human Research Unit	Washington, D.C.	Dr. H. H. McFann
Infantry Human Research Unit	Fort Benning, GA	Dr. C. J. Lange
Air Defense Human Research Unit	Fort Bliss, TX	Dr. R. G. Smith
Aviation Human Research Unit	Fort Rucker, AL	Dr. J. D. Lyons

The starting salary for a new Ph.D. was in the neighborhood of $8,000.



Contract No. DA44-109-qm-650
O. I. No. 91 (GFP-872)
Reqn. No. 49-106-778-51

DEPARTMENT OF THE ARMY

CONTRACTOR AND ADDRESS: George Washington University
Washington, D.C.

CONTRACT FOR:

Research and Scientific Studies for the Department of the Army requiring the services of qualified scientific and administrative personnel and the subcontracting of various phases of such research and scientific studies.

AMOUNT: $500,000.00

PAYMENT: To be made by the Finance Officer, U. S. Army, Washington 25, D.

The supplies and services to be obtained by this instrument are authorized by, are for the purposes set forth in, and are chargeable to the following allotment, the available balance of which is sufficient to cover the cost of the same:

7-7549 P1510-07 A2122040 S44-109

This contract is negotiated under authority Section 2(c) (1) of Public Law 413 and Presidential Proclamation 2914.

This contract is entered into with the approval of the Secretary of The Army and The Quartermaster General as set forth in Findings and Determinations attached hereto.

THIS CONTRACT, entered into as of the 27th day of July 1951 by the UNITED STATES OF AMERICA (hereinafter referred to as "the Government") represented by the Contracting Officer executing this contract, and GEORGE WASHINGTON UNIVERSITY, a non-profit corporation, organized and existing in the Districut of Columbia with its principal place of business in the City of Washington, District of Columbia, hereinafter referred to as "the Contractor".

WITNESSETH that the parties do mutually agree as follows:



HumRRO PRESIDENTS

MEREDITH P. CRAWFORD

MEREDITH CRAWFORD was born in Sweetbriar, Virginia on October 13, 1910. He attended school in Nashville, Tennessee where his father was on the faculty of George Peabody College. He earned a bachelor's degree from Vanderbilt University with a major in chemistry and a minor in mathematics. Meredith's intention was to continue on at Vanderbilt in pursuit of a medical degree, however his father convinced him to take a break and travel. He went to New York and, apparently unable to escape the desire for further education, ended up obtaining a master's degree in psychology from Columbia University in 1932. His interest in the field now piqued, Crawford obtained a doctorate in comparative psychology in 1935.

Meredith's first professional work experience came when he was hired as a staff member of the Yale Laboratories of Primate Biology. There he worked and studied with such notables as Robert Yerkes and Clark Hull. In 1939, Crawford turned to teaching, taking a position at Barnard College, Columbia University. One year later, he returned to Nashville. He became a professor at Vanderbilt University, where he also held positions such as Dean of Junior College, Dean of Instruction, and eventually Dean of the College of Arts and Sciences. During the war, Crawford served as an officer in the Army Aviation Psychology Program under the direction of John C. Flanagan. This experience included duty as the director of the testing unit for aviation cadets in San Antonio, TX, and Chief of the psychology program in the Continental Air Force in Washington, D.C.

The Human Resources Research Office of the Department of the Army was established in 1951. At that time, Harry Harlow was serving as the Army's Chief Psychologist, and it was he who recruited Crawford to serve as the new organization's first director. In fact, Meredith became the first HumRRO employee, reporting for work on August 2, 1951.

Over the years, Crawford led HumRRO through good times and bad. During the early years, he managed the organization's expansion as it grew from a relatively small staff on the campus of George Washington University to a workforce of hundreds of research and support personnel in sites across the country. The road from sole-sponsorship to an independent research organization was not always smooth, but Meredith navigated the course and saw HumRRO gain a place as a much smaller, but still viable entity. He continued to author professional papers and address a wide variety of conferences and audiences. His chapter (*Concepts of Training*) in R. M. Gagne's *Psychological Principles of System Development* stands as one of the earliest explications of the Instructional Systems Development Process. He also served in several professional organizations, including the American Psychological Association and The American Education Research Association.

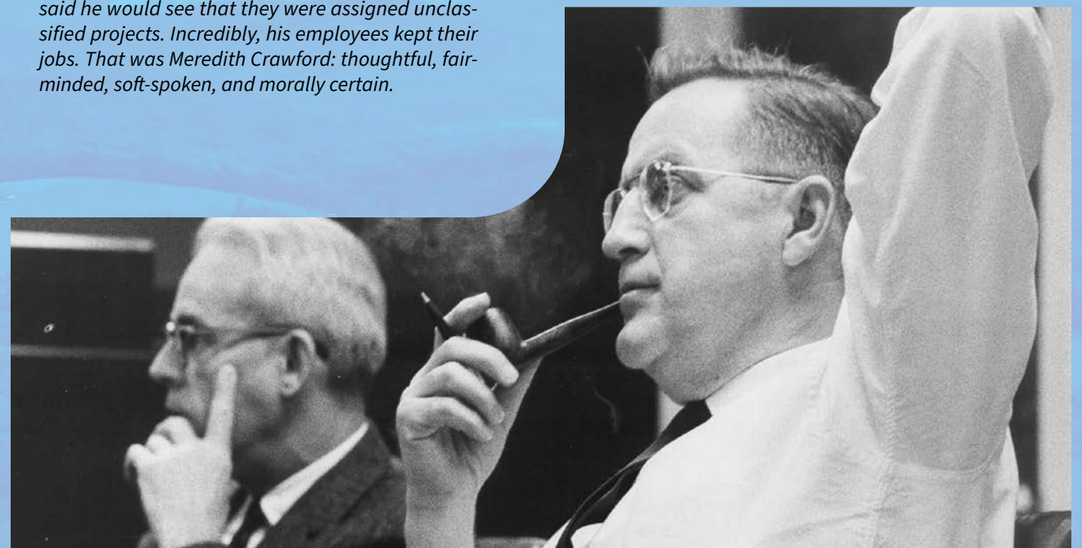
In 1992, HumRRO staff members assembled a tribute to Dr. Crawford in the form of a compendium of photographs and other memorabilia. The foreword states:

> *Organizations tend to exhibit the traits of their creators. HumRRO, accordingly, acquired the standing of an earnest, competent, innovative, client-oriented enterprise of substantial integrity. To have been part of that culture was a source of considerable pride to the staff. Many are thankful that some of this organizational character has rubbed off on us.*

Dr. Meredith P. Crawford died on May 21, 2002, at age 91. His obituary, published in *American Psychologist* (November 2002), ends with the following story:

> *One day in 1952, less than a year after he had begun his HumRRO job, several Army investigators walked into his office and told him that they had completed background checks on his staff. They told him that three of his employees were homosexuals and would have to be fired. Meredith paused for a moment, then said he would have to think about that and he would get back to them. Of course, the early 1950s were not a time in which gay rights were acknowledged. Along with the unofficial sanctions one can imagine, there was a specific government policy that prohibited homosexuals from holding security clearances. Furthermore, Meredith needed to maintain good relations with the Army because it was the sole source of funds for his organization. So, Meredith thought the matter over, then contacted the chief investigator and informed him that he had reviewed the performance of the three employees and that, because they were doing their jobs well, he could not in good conscience fire them. Yet, in light of the policy regarding security clearances, he said he would see that they were assigned unclassified projects. Incredibly, his employees kept their jobs. That was Meredith Crawford: thoughtful, fair-minded, soft-spoken, and morally certain.*





CHAPTER 1

SOLDIER REACTIONS TO WITNESSING A NUCLEAR TEST

ON NOVEMBER 1, 1952 an atomic bomb was detonated in the southern part of Nevada. Among those taking part in these nuclear tests were the Atomic Energy Commission (AEC) and the Army Ordnance Corps. Their primary interest was in the impact that these weapons would have on structures, animals, and human beings. The AEC was responsible for the control of these exercises. The Army's interest was in combat training. The primary concern was with the reactions of soldiers to such a large blast and their ability to function on what many considered to be the inevitable "nuclear battlefield" of the future.

HumRRO was barely two months old when it undertook the **DESERT ROCK** research. Due to its nascent state and relatively small staff, the organization brought in three other agencies to assist in the behavioral science component of the research being performed, all under HumRRO direction.

Two camps were established in the desert of Nevada for the purposes of the tests. Camp Desert Rock, some 65 miles north of Las Vegas, was under Army control. The shots themselves were conducted at Frenchman and Yucca flats, 25 miles north of Desert Rock. Security was extremely tight, and the Army and HumRRO conducted all activities within the safety parameters established by the AEC.

HumRRO established an experimental paradigm for each of the four detonations that its personnel studied. That is, researchers collected data on troops in the Nevada desert and on another set of soldiers who did not take part in the exercise. Every attempt was made to match the two groups in regard to such variables as tenure in the Army, marital status, and age. The principle independent variables were an indoctrination program given before the bomb was detonated and the explosion itself. Dependent variables included a set of questionnaires and performance on common military tasks.

Troops were brought to a spot 7 miles from the blast site on the morning of the detonation. An hour before the blast, the soldiers were given a final briefing on what they would experience and the effects of atomic explosions (all of which had been covered in previous sessions).





HumRRO's first project studies soldier reactions to witnessing a nuclear blast.

HumRRO researcher Robert Baldwin recounted his time at Desert Rock in a March 1958 staff memorandum, in which he described the experience of witnessing the blast:

> *The loudspeaker came on again to tell us that the time was H minus thirty seconds and to repeat the instructions regarding the protection of our eyes. I removed my glasses and held them firmly by the temple piece in my right fist. I buried my eyes in my left elbow and pressed my left arm tight against my face with my right fist. It was dark and lonely in there.*
>
> *At zero time I saw, in the darkness, a dim far off pink glow that brightened and spread, held steady for a second, then dimmed and shrunk. I knew it was the light from the device and I knew how blindingly bright it must be to reach our eyes at all under such protection.*
>
> *The loudspeaker said, "Turn!" As I uncovered my eyes I noticed it was still dark. Nothing had changed. Then we turned and I saw the thing that had been created. Far out across the miles of wasteland below us there was now dimly visible in the first morning light the golden fireball boiled and churned like a genie in a bottle, cooled to orange splotched with deep dirty brown, cooled to heavy violet and as it cooled its shimmering blue corona contracted and glowed around it. The fireball rises at a speed of sixty miles an hour, but at this distance its ascent seemed slow.*

Following the blast, technicians spent an hour or more measuring radiation levels in the area. When assured it was safe, Army leaders had the soldiers transported to a site about one-half mile from the blast point to observe its effects. They were instructed to not touch anything. Afterwards, they returned to their base camp.

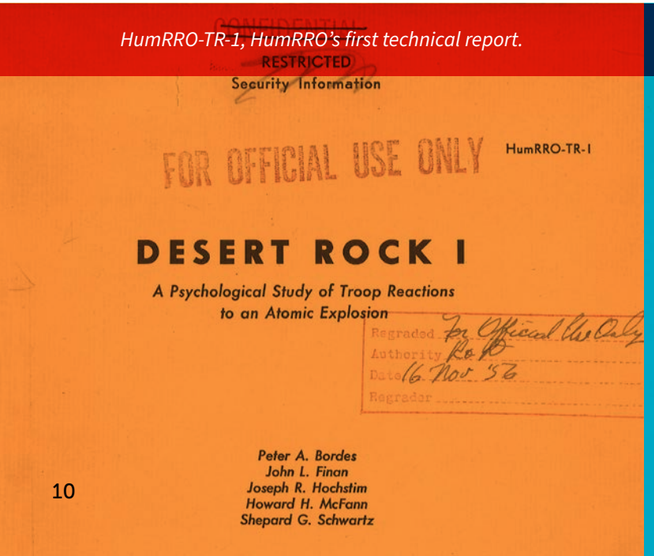
HumRRO personnel administered a total of four questionnaires to the participating and non-participating troops at various intervals prior to and following the first Desert Rock blast. The queries covered such topics as attitudes towards military life, self-confidence, anxiety about participating in the maneuver, and opinions about the indoctrination. Subsequent versions of the experiment included additional measures such as performance tests and projective tests.

Findings showed that the indoctrination program resulted in a significant increase in knowledge regarding atomic weapons and their effects. Self-confidence in one's ability to sustain both conventional and atomic warfare increased following the exercise, as did their confidence in experts' ability to control the A-bomb. Participants' estimates of their units' combat readiness showed a noteworthy decrease 18 days after the maneuver, as did worries about its effects. Education level was related to many of these findings, with those with less formal education reporting lower confidence and higher incidence of physiological impact due to anxiety. The researchers suggested that their findings were related to a greater ability on the part of more-educated soldiers to absorb and retain the information provided in the briefings.

Forty-two years after the first Desert Rock detonation, President William Clinton established the Advisory Committee on Human Radiation Experiments. The committee was to investigate possibly unethical government-funded experiments that involved radiation. One chapter of the final report concerns "Human Research at the Bomb Tests." The history of these undertakings is traced, including the fact that high-level officials within DoD felt that having troops at bomb tests was essential for demonstrating that the fear that ionizing radiation following explosions "presents a dangerous hazard to personnel is groundless."

Given HumRRO's relatively minor role in the Desert Rock exercises, it seems odd that this work should be referred to as "The HumRRO Experiments" in the Committee's report. Indeed, they acknowledged that, "the Army did not treat HumRRO as a discretionary research activity but as an element of the training exercise in which soldiers were participating in the course of normal duty." The Committee went on to state that, "although the experimental variable was participation at a bomb test, arguably, the troops would have been present at the test in any event, along with many thousands of soldiers who were not subjects of the HumRRO research." Finally, after reviewing admittedly flawed epidemiological data from this and other DoD-sponsored research, the committee concluded that there was no consistent pattern of increased cancer risk among veterans who took part in research of this type.

Many years later, Meredith Crawford recounted his experience at Desert Rock. HumRRO was only in its second month of existence at the time of the research, so with few staff members available, its President went to the desert to take part in the exercise. He recalled waiting with some troops for the atomic blast to take place. Several soldiers were playing dice and, according to Crawford, using "oaths" that he had never heard before. As he stood there and listened, he wondered what new levels their profanity would reach when they saw the large mushroom cloud that was about to visit them. As the plane approached, the group turned their backs away from the blast site and then, when instructed, turned around to witness the awesome destructive force that had just been unleashed. Crawford listened carefully to the soldiers as one turned to the other and said, "You know, it's *extraordinary*."



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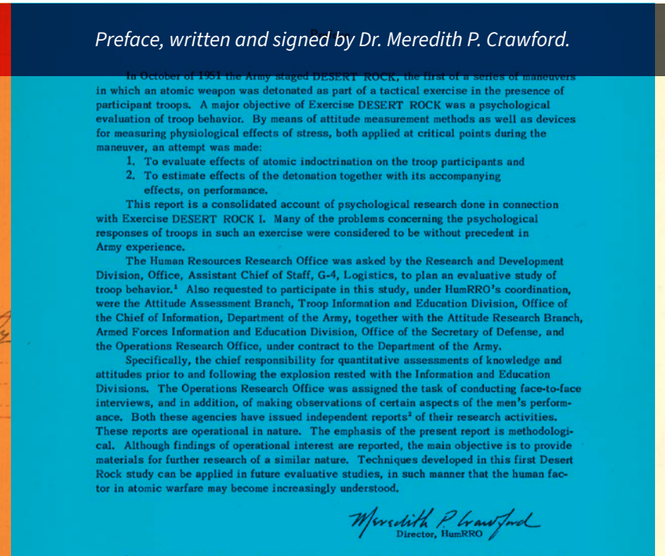
DESERT ROCK I

A Psychological Study of Troop Reactions to an Atomic Explosion

Regraded for Official Use Only
Authority RAB
Date 16 Nov 56
Regrader

Peter A. Bordes
John L. Finan
Joseph R. Hochstim
Howard H. McFann
Shepard G. Schwartz

HumRRO-TR-1, HumRRO's first technical report.



In October of 1951 the Army staged DESERT ROCK, the first of a series of maneuvers in which an atomic weapon was detonated as part of a tactical exercise in the presence of participant troops. A major objective of Exercise DESERT ROCK was a psychological evaluation of troop behavior. By means of attitude measurement methods as well as devices for measuring physiological effects of stress, both applied at critical points during the maneuver, an attempt was made:

1. To evaluate effects of atomic indoctrination on the troop participants and
2. To estimate effects of the detonation together with its accompanying effects, on performance.

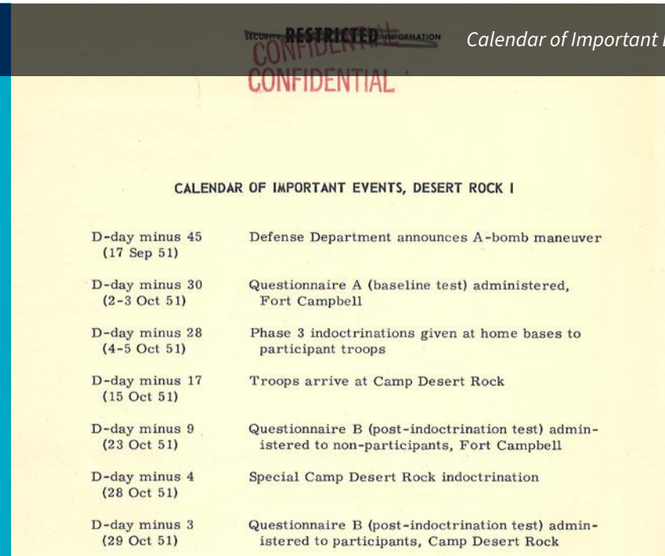
This report is a consolidated account of psychological research done in connection with Exercise DESERT ROCK I. Many of the problems concerning the psychological responses of troops in such an exercise were considered to be without precedent in Army experience.

The Human Resources Research Office was asked by the Research and Development Division, Office, Assistant Chief of Staff, G-4, Logistics, to plan an evaluative study of troop behavior.[1] Also requested to participate in this study, under HumRRO's coordination, were the Attitude Assessment Branch, Troop Information and Education Division, Office of the Chief of Information, Department of the Army, together with the Attitude Research Branch, Armed Forces Information and Education Division, Office of the Secretary of Defense, and the Operations Research Office, under contract to the Department of the Army.

Specifically, the chief responsibility for quantitative assessments of knowledge and attitudes prior to and following the explosion rested with the Information and Education Divisions. The Operations Research Office was assigned the task of conducting face-to-face interviews, and in addition, of making observations of certain aspects of the men's performance. Both these agencies have issued independent reports[2] of their research activities. These reports are operational in nature. The emphasis of the present report is methodological. Although findings of operational interest are reported, the main objective is to provide materials for further research of a similar nature. Techniques developed in this first Desert Rock study can be applied in future evaluative studies, in such manner that the human factor in atomic warfare may become increasingly understood.

Meredith P. Crawford
Director, HumRRO

Preface, written and signed by Dr. Meredith P. Crawford.



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CALENDAR OF IMPORTANT EVENTS, DESERT ROCK I

D-day minus 45 (17 Sep 51)	Defense Department announces A-bomb maneuver
D-day minus 30 (2-3 Oct 51)	Questionnaire A (baseline test) administered, Fort Campbell
D-day minus 28 (4-5 Oct 51)	Phase 3 indoctrinations given at home bases to participant troops
D-day minus 17 (15 Oct 51)	Troops arrive at Camp Desert Rock
D-day minus 9 (23 Oct 51)	Questionnaire B (post-indoctrination test) administered to non-participants, Fort Campbell
D-day minus 4 (28 Oct 51)	Special Camp Desert Rock indoctrination
D-day minus 3 (29 Oct 51)	Questionnaire B (post-indoctrination test) administered to participants, Camp Desert Rock
D-day minus 2 to 1 (30-31 Oct 51)	First polygraph test administered, Camp Desert Rock
D-day (1 Nov 51)	A-bomb explodes. Questionnaire C (post-bomb test) administered in the afternoon, immediately after return to Camp Desert Rock
D-day plus 13 to 36 (14 Nov-7 Dec 51)	Second polygraph tests administered to participants, Fort Campbell
D-day plus 14 to 33 (15 Nov-4 Dec 51)	Control polygraph tests administered to non-participants, Fort Campbell
D-day plus 18 (19 Nov 51)	Questionnaire D (delayed effects test) given to participants and non-participants, Fort Campbell
D-day plus 25 (26 Nov 51)	Questionnaire D (delayed effects test) given to participants and non-participants, Fort Lewis

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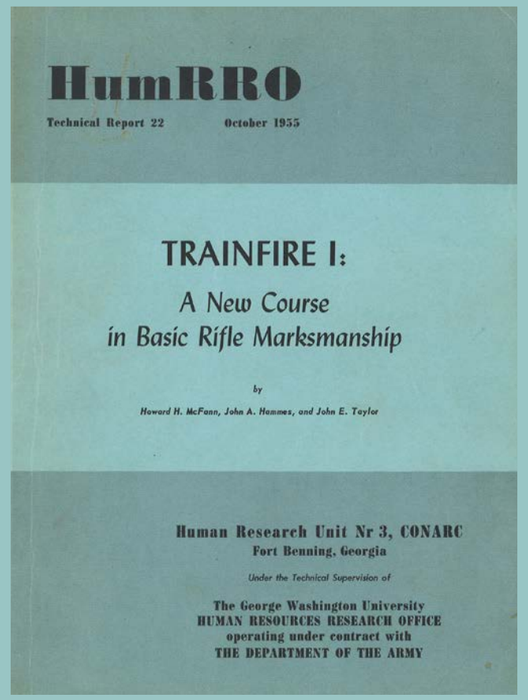
Calendar of Important Events, Desert Rock I.

1951—1960

"Punchy Pete" was the name given to the targets used in TrainFire.



HumRRO Technical Report 22, TrainFire I: A New Course in Basic Rifle Marksmanship, October 1955.





MARKSMANSHIP TRAINING

ON JUNE 25, 1953, President Dwight Eisenhower received a letter from Howard C. Sarvis of New Meadows, Idaho. Mr. Sarvis had some new ideas about "rifle shooting" that he shared with the President. His letter was referred to the Chief of the Human Relations and Research Branch of the Army who, in turn, sent it to HumRRO. On October 14 of that same year, Mr. Sarvis met with representatives of the Department of the Army and HumRRO to discuss his ideas. Subsequently, HumRRO was directed to study the issue in order to devise training methods that would more realistically simulate combat conditions and more thoroughly integrate marksmanship training into the overall basic training experience. The researchers studied the conditions under which soldiers used their weapons in combat, developed training methods that would more closely approximate such conditions, devised measures to assess marksmanship ability, and evaluated the revamped training program using the newly-derived proficiency tests.

The study of combat conditions led to several conclusions that were to have a strong impact on subsequent efforts. The findings included the following facts:

1. Enemy targets are rarely visible except in close assault.
2. Indications of targets are usually fleeting.
3. The prone position is often precluded by conditions under which firing will take place.
4. Elevation is a crucial element of aiming that is complicated by the conditions under which the skill must be employed and the training practices in effect at the time.

In examining the extant training program, HumRRO researchers concluded that there were several problems. Chief among them was the lack of realism inherent in the training, often the result of a greater concern with safety than with the efficacy of the training itself. The major changes introduced included the introduction of moving targets that appeared for brief intervals and resembled opposing forces. Changes were also instituted in the position assumed during training, with a greater emphasis placed on firing while kneeling or standing as opposed to being prone. New aiming strategies were introduced to correct for common errors that resulted from the conventional methods. These innovations were found to significantly improve trainees' ability to detect and hit targets. As a result, marksmanship training was substantially revised throughout the Army, with the innovations copied by professional organizations and law enforcement agencies throughout the country. Nearly every soldier who passed through basic training took part in **TRAINFIRE** exercises. The success of this project was extremely important to the still nascent HumRRO. Senior military leaders began to see that a group of civilian psychologists could actually achieve results that had a significant, positive impact on the Army.

Lt. Gen. James M. Gavin, then Army Chief of Research and Development, noted that, *"HumRRO research and development … has paid off handsomely and will continue to do so by providing the Army with improved means to increase our strategic and tactical capability. The best single example of this payoff, developed at Fort Benning and introduced at training centers in 1957, is the so-called TRAINFIRE system of rifle marksmanship training. This new system: increases battlefield proficiency; decreases training time, saving trainee and trainer man-hours; improves motivation for marksmanship; and offers long-run cost savings for range facilities. I have every expectation that improved capabilities of a similar or greater magnitude will result in the future from the HumRRO work now underway."*

IDENTIFYING FIGHTERS AND NON-FIGHTERS

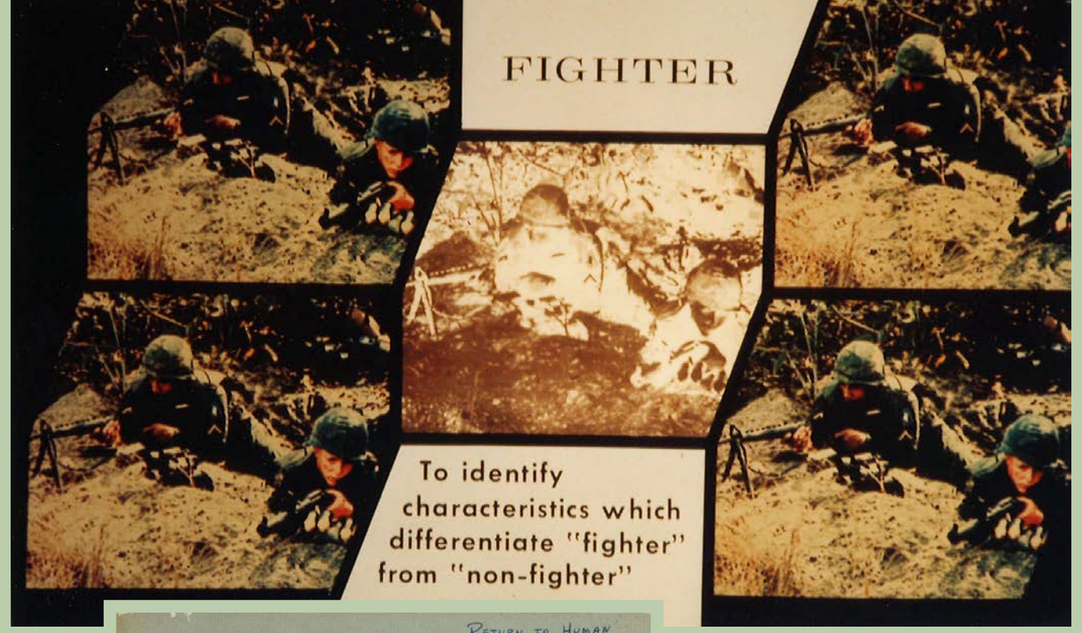
FOLLOWING WORLD WAR II, as had been the case in previous conflicts, a much-discussed topic was the incidence of ineffectual performance on the battlefield. Some estimates suggested that only 15% of soldiers actually discharged their weapons during firefights. Although these figures were disputed, the fact remained that the failure of a significant proportion of soldiers to contribute to the efforts of their comrades was cause for concern amongst Army leadership. As a result, the degradation of behavior in combat was one of the first areas of investigation HumRRO was tasked to examine. **FIGHTER I** was designed to isolate those characteristics that are identified with individuals who perform well under combat conditions versus those who do not, in the hopes of improving selection, classification, and training practices to overcome the noted deficits.

HumRRO researchers went to Korea. As it turned out their trip occurred shortly after the cease-fire agreement was reached in 1953. There they interviewed members of the 45th Infantry Division, which had last been engaged in the Christmas Hill area, and with companies of the 2nd and 7th Infantry Divisions, which had last seen action in the Kumhwa Valley and on Porkchop Hill, respectively. A total of 647 men were asked to think about a combat situation they had actually experienced and to name two or three men they would most like to have beside them in action, and two or three that they would least like to be there. They were then asked to describe actual incidents from past close combat to support their choices. So-called Fighters were selected when two or more of their comrades had identified them positively or one individual mentioned their name and it was known that some commendation resulted from the action described. Non-Fighters were similarly selected. From the 1,000 men mentioned, 345 were selected as Fighters or Non-Fighters.

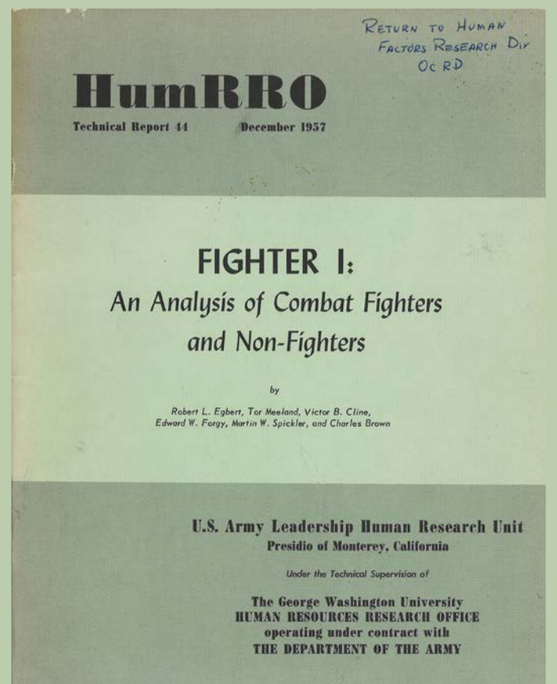
The incidents themselves were used to generate categories of behavior that described the two classes of soldiers. Generally, Fighters were found to provide leadership, take aggressive action, and/or perform supporting tasks while under fire. Non-Fighters withdrew from the scene (either physically or psychologically), malingered, over-reacted, or became incapacitated.

The selected soldiers underwent a week of psychological tests. These included personality and interest inventories, intelligence tests, and life history measures. In all, some 27 questionnaires and 60 objective tests were administered, yielding over 400 separate scores. The data were then analyzed in an attempt to isolate differences between the two groups.

In the final analysis, HumRRO researchers found that Fighters and Non-Fighters could be distinguished on several dimensions. Fighters were more intelligent, socially mature, emotionally stable, healthier, exhibited greater leadership potential, and possessed more military knowledge. The authors suggested that the findings be used to develop classification and assignment procedures that would permit combat arms to identify and select potential Fighters with maximum effectiveness. In addition, they suggested that training be examined to isolate practices that might inculcate the traits and/or attitudes that characterize soldiers who perform better under conditions of combat. It's not clear that these suggestions were ever acted upon in any large-scale fashion, but the Fighter study achieved some notice nonetheless. And the search for ways to increase soldier effectiveness in combat went on.



A briefing slide from work unit Fighter.



HumRRO Technical Report 44, Fighter I: An Analysis of Combat Fighters and Non-Fighters, December 1957.

ASSESSING THE IMPACT OF STRESS ON PERFORMANCE

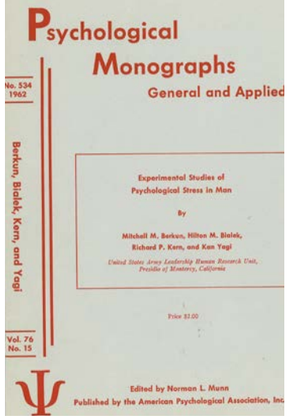
AS PART OF ONGOING EFFORTS to identify characteristics and situational variables that relate to effectiveness in combat, HumRRO researchers carried out perhaps the most infamous work attributable to the organization through work unit **FIGHTER IV**. The goal was to achieve an understanding of the relationship between stress and performance and perhaps identify ways in which the impact of stress could be reduced. As a first step, the literature was reviewed to ascertain methods by which those studying psychological stress had induced it under experimental conditions. The researchers concluded that these attempts largely failed because subjects realized that they were in a controlled environment, and therefore were not likely to be placed in situations that involved real danger. The latter was a necessity in the present case, given the interest in the performance of soldiers in combat. Therefore, situations needed to be created in which the "cognitive defense" subjects use to shield themselves under conditions of artificially manufactured stress could be circumvented. Furthermore, the need to measure the impact of stress on performance mandated that the tasks embedded in the scenarios appear logical and necessary.

The first such experiment involved three groups of subjects. The experimental group was taken up in an airplane and, during the course of the flight, was led to believe that mechanical problems had developed that would require that the plane be ditched in the ocean. The first control group experienced an uneventful flight; the second remained on the ground. The performance measure involved completing two forms, one assessing knowledge and the other the ability to follow directions. Subjects also completed the Subjective Stress Scale (SSS), and underwent measures of physiological stress. The expected effects—elevated stress levels and decreased performance—were found in the experimental group on all three measures.

Additional experiments were conducted to explore stress reactions in situations where subjects had a course of action available to them that might relieve the conditions that were generating the stress. In each case, new recruits were placed at an outpost with a radio and told to maintain lookout for planes. During the course of the experimental period, the subjects were first led to believe that their radios were malfunctioning in such a manner that their communications to a command post could not be heard. One of three threat situations was then presented. In the first, artillery simulators were detonated around the soldier's position while messages heard over the radio indicated that there was indeed errant fire. The second scenario involved the inadvertent release of radioactive material that was, according to messages, blanketing the area in which the soldier was posted. Finally, some subjects heard messages about a large forest fire that was spreading quickly. At the same time, artificial smoke was generated in the vicinity. The performance measure in this case involved following written instructions posted on the radio in order to correct the malfunction. Various timing devices allowed researchers to determine how long it took subjects to begin and finish the several tasks involved.

The results indicated that only one of the situations—misdirected artillery—raised the stress ratings and had a negative impact on the performance of participants above that of a control group made up of soldiers who were placed in a similar situation as described above with no apparent threat to their safety.

One final manipulation was attempted. In this case soldiers were taken to a remote location where there was a bunker. They were given the task of matching color-coded wires that would activate a remote control circuit for explosives that were supposedly at some distance from the site. They were told to complete the task and then throw a switch that would activate the circuit. The communications devices (a field phone and intercom) were also explained before the subject was left alone. When he completed the wiring and threw the switch, a large explosion was set off at the distal site. A tape-recorded message was then played over the intercom indicating that the explosion had injured a group of soldiers. The subject was told to use the phone to call for assistance. However, the phone would not work. After five minutes, another message came through indicating that there were instructions on the phone that he could follow in case it was not working. Over the next 35 minutes, communications continued to be heard, including questions about the progress being made fixing the phone, concerns about whether one of the victims would survive, and suggestions that the Military Police wanted to interview the subject. Throughout, a member of the experimental team secretly watched the subject so that he could intervene in case of a severe emotional reaction. The results indicated that this simulation produced the most extreme stress reaction in soldiers, particularly among those with less experience.

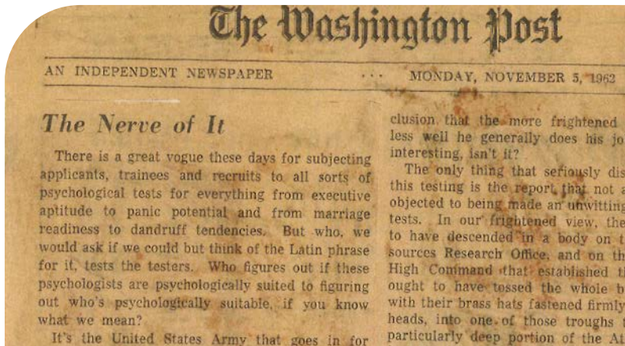


In addition to contributing to the methodological literature regarding the study of stress, these experiments yielded a conceptual model of the concept with implications for the way in which training is conducted. These include the need for stimulus fidelity in the cues critical to the desired job performance; a high correspondence between the actions needed in the "real world" and those in training; a high degree of fidelity in regard to the outcomes that result from performing the required actions; and repeated practice with such situations to minimize the impact of stress after transfer from a training environment.

The results of these experiments were published in *Psychological Monographs* and other civilian outlets, and documented in presentations at various conferences. It was at one such presentation that a British psychologist heard of the work and was distressed by the way America treated its soldiers. His concerns, along with others, elevated the issue until it was finally taken up by the Board of Ethics of the American Psychological Association. After a thorough review, HumRRO was cleared of any wrongdoing but, according to Meredith Crawford, told to be careful in the future.

This work received some attention from an unlikely source. *The Washington Post* somehow became aware of it and, in an editorial published on November 5, 1962, decided to weigh in:

> *The only thing that seriously disturbs us about this testing is the report that not a single recruit objected to being made an unwitting subject of the tests. In our frightened view, the testees ought to have descended in a body on the Human Resources Research Office, and on the whole Army High Command that established that office, and ought to have tossed the whole bunch of them, with their brass hats fastened firmly on their brass heads, into one of those troughs that provide a particularly deep portion of the Atlantic Ocean—just for the fun of it, of course, and to test how they'd react. That would be, we think, a thoroughly American response. It would also be thoroughly healthy.*


The Washington Post

AN INDEPENDENT NEWSPAPER ··· MONDAY, NOVEMBER 5, 1962

The Nerve of It

There is a great vogue these days for subjecting applicants, trainees and recruits to all sorts of psychological tests for everything from executive aptitude to panic potential and from marriage readiness to dandruff tendencies. But who, we would ask if we could but think of the Latin phrase for it, tests the testers. Who figures out if these psychologists are psychologically suited to figuring out who's psychologically suitable, if you know what we mean?

It's the United States Army that goes in for

clusion that the more frightened less well he generally does his jo interesting, isn't it?

The only thing that seriously dis this testing is the report that not objected to being made an unwitting tests. In our frightened view, the to have descended in a body on t sources Research Office, and on th High Command that established t ought to have tossed the whole b with their brass hats fastened firmly heads, into one of those troughs particularly deep portion of the A

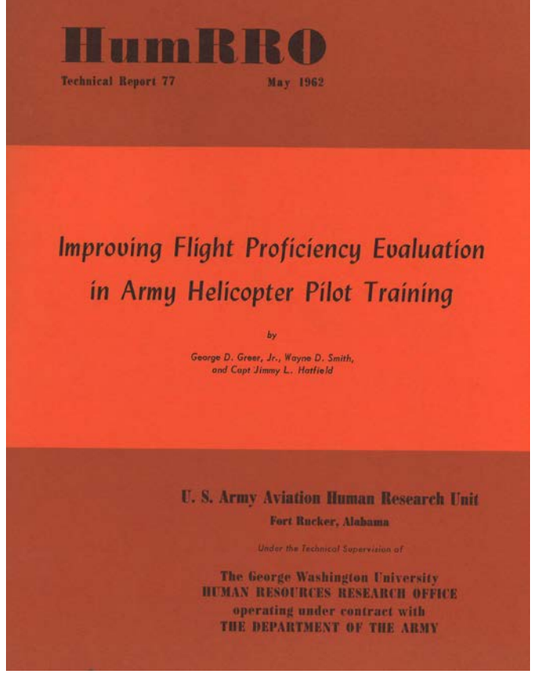
1951—1960

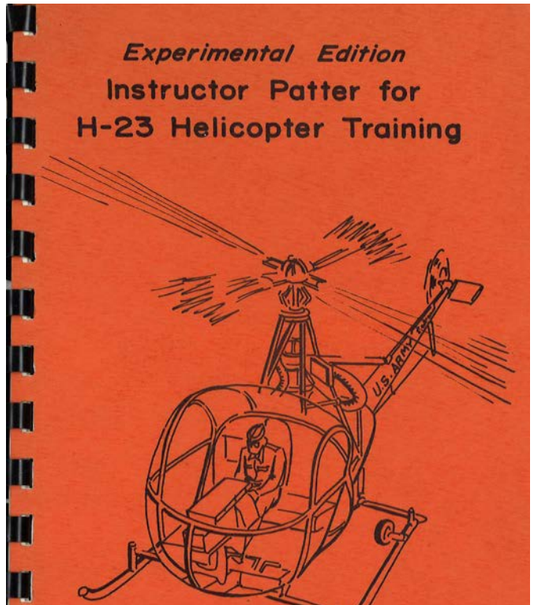
ASSESSING TRAINEE FLIGHT PERFORMANCE

IN THE LATE 1950s, HumRRO researchers at the Fort Rucker Aviation School began studying student flight proficiency and how it can be measured validly and reliably. This had long been a basic problem for aviation training and performance researchers. One of the first things they noted was a high degree of variability in the way graders, known as check pilots, applied standards. They found that, over time, some check pilots failed many students while others failed almost no one. One result of this inconsistency was that students and instructors devoted "a substantial amount of physical and emotional energy to the problem of determining and trying to control who will give the check." More importantly, it indicated a considerable and unacceptable lack of consistency in the flight evaluation process.

One of the first problems addressed was how to standardize the aspects of performance that were evaluated. HumRRO researchers found that check pilots had varying perceptions of the specific maneuvers that demonstrated competence or a lack thereof. The research team developed a list that described the areas of flight training in which students have the most difficulty. Each of these was analyzed and broken down into its components, for which rating scales were developed. The basic approach was similar to that which had been developed in World War II as part of the U.S. Army Air Force psychological research program. The scales were tested under simulated conditions, and researchers found that the sheer number of scales was overwhelming, even for experienced check pilots. As a result, further efforts were expended to limit the number of components to be rated so that each set was manageable but also reflective of the most critical components of each of the maneuvers. These measures were assembled into the Pilot Performance Description Record (PPDR). This booklet covered all flight maneuvers that beginning student helicopter pilots were required to learn. Each maneuver was broken down into segments, which were in turn broken down into specific items of performance. These scoring scales were marked in flight by the check pilot drawing a slash through the appropriate line of the scale. The check pilots then used this information after the flight to generate a score for each maneuver as well as an overall performance rating. The graphic nature of the PPDR provided a clear and objective means for showing the student pilot precisely how he had performed and what his errors had been. It could thus aid the instructor or check pilot in debriefing the student and providing task-specific feedback. After experimental tryouts, results showed a much-increased degree of reliability and significantly higher correlations between PPDR scores received and training grades. As a result, the PPDR was adopted for use at the Primary Helicopter School as the standard method for flight proficiency evaluations.

The PPDR had additional benefits. First, it allowed for the implementation of a real-time quality control system for program managers. At the end of each day or check ride period, the flight data could be aggregated and analyses carried out to examine such things as check-pilot and instructor-pilot standardization, instructional areas in need of improvement or change, class comparisons, and effects of instituting changes in instructional methodology. In addition to providing the means for training quality control, the basic PPDR approach to flight performance measurement provided a methodology that was used in virtually all subsequent HumRRO aviation training research and by many other researchers in similar contexts.





Right images: HumRRO developed an Instructor Patter for H-23 Helicopter Training. A Patter Manual refers to the standardized speech that flight instructors use when demonstrating maneuvers in the air.

A WELL-KNOWN HumRROvian



JEANE JORDAN KIRKPATRICK received her Ph.D. from Columbia University in political science. She began teaching at Georgetown University in 1967, achieving the status of full professor in 1978. A Democrat at the time, she was actively involved in politics as a supporter of Hubert Humphrey. Later, she became disenchanted with the party, and wrote several articles that were critical of the foreign policy of Jimmy Carter. This brought the attention of Ronald Reagan, and she became his foreign policy advisor during the 1980 presidential campaign. Following Reagan's victory, Kirkpatrick served as United States ambassador to the United Nations. She eventually returned to Georgetown while maintaining a public profile as a commentator on national and world affairs.

As a HumRRO employee in the 1950s, Kirkpatrick was co-author of a confidential report entitled *Determinants of Loyalty and Disaffection in Chinese Communist Soldiers During the Korean Hostilities: An Exploratory Study*.

TRAINING TANK CREWMEMBERS

HumRRO's ARMOR HUMAN RESEARCH UNIT came into being in 1952 and immediately set about the task of examining such issues as armor operations at night, methods of improving target detection skills, techniques for improving tank mechanic training, and means of increasing communication proficiency using a human factors approach. One early finding of this research program was that the average performance of armor personnel graduating from the schools fell substantially below the expectations of senior Army personnel. In addition, the training did not achieve the goal of interchangeability of crewmembers (drivers, loaders, gunners).

After extensive study, HumRRO researchers noted several deficiencies in the existing armor training, and developed an experimental program to overcome them. As a start, they analyzed the job requirements and job descriptions for tank crewmembers and compared them with the current Program of Instruction (POI). They found that instructors were teaching crewmembers a variety of tasks that were in fact exclusively the domain of commanders. These were eliminated from the experimental program. The remaining tasks were examined for the frequency with which they were performed and their criticality. This led to a prioritization of tasks that reflected their relative importance. Another issue addressed in the experimental program was training schedules. Due to problems with equipment availability, trainees were spending a great deal of time simply waiting for their turn for hands-on practice of crewmember tasks. This information enabled commanders to schedule training in small groups that would maximize the opportunity to practice relevant skills and minimize waiting periods. As a result, training times were cut significantly. For instance, driving and maintenance training time was cut from 82 to 50 hours, while increasing the time trainees actually spent driving the tank.

The development of the experimental program was driven by seven principles:

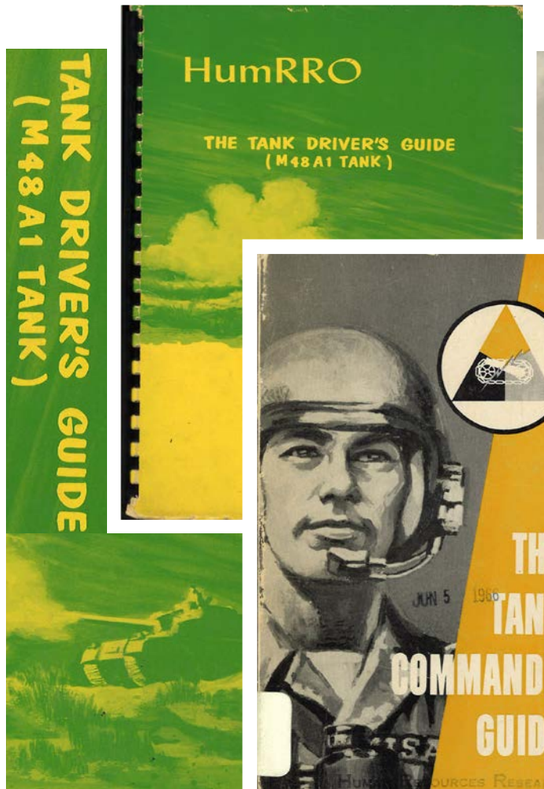
1. The training must be strictly focused on the objectives.
2. The relationship between tasks must be emphasized to provide the bigger picture for trainees.
3. Crewmembers must learn by doing as much as possible.
4. Communication must be enhanced by improved job aids and reduced reliance on unnecessary nomenclature.
5. Trainees must be made aware of their status through the introduction of frequent performance tests with feedback.
6. The motivation of trainees must be addressed through such techniques as providing a picture of the history and importance of armor.
7. All training and exercises need to incorporate as much realism as possible.

Two companies of 160 men each were formed and equated to the degree possible on such factors as aptitude. One company was assigned to the experimental POI, while the other received the traditional training. Such factors as quality of officers and instructors were also equated. Following training, both groups were given an extensive armor performance test, including 21 subtests and 405 multiple-choice items. This instrument was developed by an independent third party based on training objectives and job descriptions. In addition, the trainees took the Armor Proficiency Test (APT), an assessment instrument already in use at the time. Results showed significant differences between the two groups on 14 of the subtests of the newly created test battery. In 11 of these cases, the difference favored the experimental group. In the three cases where the control trainees performed better, the tasks were among those de-emphasized in the revised training because they were not found to be critical to job performance. Both groups scored equally well on the APT.

Thus, the experimental POI achieved superior results while eliminating two weeks of training time. This finding led to its adoption as the standard training program for U.S. Army tank crewmembers.

Another significant result of work unit **SHOCKACTION** was the publication of a series of guides for each crewmember position: *The Tank Loader's Guide*, *The Tank Gunner's Guide*, *The Tank Driver's Guide*, and *The Tank Commander's Guide*. These documents presented step-by-step instructions for carrying out the tasks associated with each job, including an abundant use of pictures. They became extremely popular, with the Commander's Guide eventually being published commercially. In a review of this volume, Major General Paul A. Disney stated that, "… *The Tank Commander's Guide* is an important and highly effective addition to current official Army training publications and should assist materially in the development, and further training of tank commanders."

The Commander's Guide resulting from work unit Shockaction was published commercially.







HumRRO BY ANY OTHER NAME ...

IN THE SPRING OF 1956, Meredith Crawford raised the issue of whether HumRRO's name should be changed. He was concerned that the term "human resources" was not well understood, and that the name in general did not immediately suggest to people what the organization did. His preliminary alternative was "the Army Training Research Agency/Institute/Organization/Office. Crawford acknowledged the potential problems with this formulation, including the possibility that the new name would limit the type of work people considered appropriate for HumRRO.

Several members of the senior staff agreed with Crawford's idea of a name change, offering suggestions of their own (e.g., Center for Training Research). Others did not. John Finan, adviser of Research Results, felt that the organization would lose more than it gained by taking this action. "Originally the name 'Human Resources' was devised as a dodge to circumvent the stigma which (for reasons that have never been altogether known to me) during the immediate postwar period came to be attached to the word psychology. I am pretty sure that 'Training Agency' was considered, then, as a possible alternate, but was discarded because of its overly circumscribed connotation."

In the end, Crawford arrived at the same conclusion. "I have come to realize that during the past five years of its operation HumRRO has become much more widely known in the Army, and an understanding is being gained of the nature of the organization. It has been pointed out to me that the word 'human' is the distinctive aspect of the name and carries with it the connotation of the importance of the human being in military operations. Finally, the abbreviation or code name, 'HumRRO,' is a convenient symbol and has actually become a kind of trademark. In terms of a business organization, I feel that this trademark is an intangible asset which should not be given up."

And so, it wasn't.

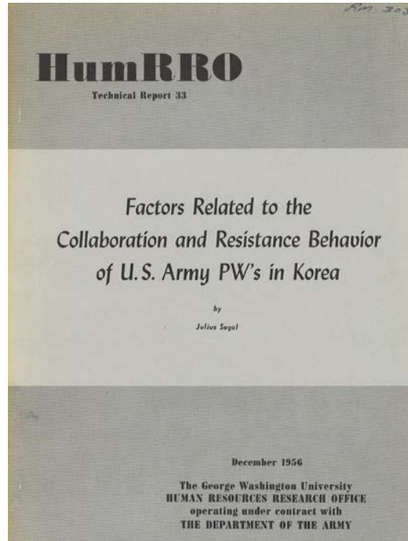
COLLABORATOR OR RESISTER?

OVER THE COURSE OF THE KOREAN WAR (1950-1953), enemy forces took some 6,656 American Army Prisoners of War (POWs). Approximately half of these men died while imprisoned, most in the early phase of the war before Chinese involvement increased and their potential for exploitation was recognized. Some 3,323 Army POWs were repatriated following the conflict. A key question that arose from this experience centered on the possibility of developing training for soldiers that dealt specifically with what one should expect if taken prisoner under wartime conditions, and steps that prisoners can take to minimize the possibility of exploitation.

POWs returning from Korea were studied by the Army to determine what actions, if any, should be taken in each case. HumRRO researchers were given access to the resulting files. The first step in the research was to focus on the behavior of these individuals as POWs. Researchers categorized cases as Participators (15%), Middle (80%), and Resistors (5%). Participators were individuals who were court-martialed or given dishonorable discharges based on evidence that they provided information to the enemy while captive. The large Middle group represented men who were found to have neither capitulated to enemy demands nor taken any action to actively resist. Finally, Resistors comprised persons who were recommended for medals based on their behavior while in captivity and/or who were found to have committed at least two acts of resistance with no indication of cooperation.

A stratified random sample was drawn from each group, and extensive data gathered in each case. Such data included the details of postwar Army investigations, information on civilian and military experiences of each soldier, and their health records. Overall, some 300 data elements were generated for each case. Researchers then examined this information to determine if there were elements that differentiated between the three groups. The ultimate goal was to develop a program of instruction that would provide soldiers with information that could be of use to them should they become POWs, and thereby decrease the likelihood that they would become "Participators."

Although certain background characteristics were found to differentiate participators and resistors (e.g., the former being of lower aptitude), such findings led to few areas where a potential training intervention could be effective. Generally, the content of possible training was found to be of an informational and attitudinal nature. Soldiers need to be instructed as to the negative consequences of cooperation with the enemy, both on their fellow soldiers/POWs and the nation as a whole. A training program should emphasize the mission of captured soldiers—rendering the enemy's psychological warfare program as ineffective as possible—and provide the tools for doing so (e.g., maintaining personal hygiene/health, activating and operating covert resistance, techniques of escape and survival). Finally, soldiers need to have the knowledge that they will be able to survive the physical and psychological onslaught that they may experience as Prisoners of War.


HumRRO
Technical Report 33

Factors Related to the Collaboration and Resistance Behavior of U.S. Army PW's in Korea

by
Julius Segal

December 1956

The George Washington University
HUMAN RESOURCES RESEARCH OFFICE
operating under contract with
THE DEPARTMENT OF THE ARMY

HumRRO Technical Report 33, Factors Related to the Collaboration and Resistance Behavior of U.S. Army PW's in Korea, December 1956.

HumRRO NOTABLES

LOLA ZOOK

HumRRO Publications Manager & Editorial Consultant



LOLA DOROTHY MOELLER was born on September 6, 1909 in Everly, Iowa. She graduated from high school in Spencer, Iowa in 1926 and then went on to the University of Iowa where she earned a Bachelor of Arts degree and a journalism certificate in 1930. She graduated Magna Cum Laude and was elected to honor societies including Phi Beta Kappa and Theta Sigma Phi (journalism).

After college, Lola, like her brother Leslie before her, began her career in the newspaper business. Beginning in Iowa and branching out through the Midwest into the Southwest, Lola held a series of positions on newspapers in small communities, usually as managing editor. Early in her career, while working for the *Flagstaff Journal* in Arizona, she met a fellow newspaperman named Maurice Zook. They married in 1932 and together traveled and covered the news. Mr. Zook joined the Red Cross during World War II and Lola joined him on assignment in Tokyo in 1947. There she served for four years as the Chief of the Editorial and Production Division of the National Resources Section (General Headquarters, Supreme Commander for the Allied Powers) of the Department of the Army. Her job was to edit and publish reports on Japanese natural resources in the post-World War II period. She was responsible for more than 100 reports and 200 issues of a weekly summary. In recognition of her efforts, she was given the Award for Meritorious Civilian Service by General Matthew B. Ridgway.

In 1952, the Zooks relocated to Northern Virginia. A year later she responded to HumRRO's "male help" advertisement in the *Washington Post*. Despite her gender, Lola landed the job of managing editor for HumRRO publications at the annual salary of $6,500. As her tenure with HumRRO grew longer, her abilities and contributions received more and more recognition. Over a career of more than 22 years with HumRRO, Lola possessed various titles including Acting Chief of the Editorial Office, Publications Manager, and Director of the Editorial and Production Center. HumRRO's first President, Meredith Crawford, said that she "effected quality in HumRRO publications more than any other person." Her ability to craft readable and well-organized manuscripts from the writings of social scientists was widely admired. In addition, through her winning personality she was able to soothe researchers who had invested much time and ego in their documents and, as Dr. Crawford put it, had them "eating out of her hand."



Lola Zook at the 1964 Director's Conference.





Mrs. Zook retired from HumRRO in 1976. Over the next 23 years—until her death in 1999—she maintained an active relationship with the organization, serving as a consultant and writer on many projects. In May of 1999, Lola was honored as an Exemplar by the Society for Technical Communication, of which she was a fellow. In conjunction with that organization, HumRRO established the **Lola Zook Award for Excellence in Technical Communication**, to be given annually to the authors of a report that best exemplifies the standards Lola evidenced through her work.

LOLA ZOOK AWARD WINNERS

1999

Evaluation of the DoD Armed Services Vocational Aptitude Career Exploration Program
Janice Laurence and Peter Ramsberger

2000

Population Representation in the U.S. Military
Monica Gribben

2001

Survey and Assessment of Fatigue in the Air Traffic Control Workforce
Bob Ramos, Rod McCloy, and Jennifer Geimer

2002

Command Group Training in the Objective Force
Bob Gossman, Billy Burnside, Michael Flynn, Milton Dannenmiller, and Rebecca Mauzy

2003

Relationship Among Kentucky's Core Content Test, ACT Scores, and Students Self-Reported High School Grades for the Class of 2000
Emily Dickinson, Milt Koger, Gene Hoffman, and Art Thacker

2004

Army Enlisted Personnel Competency Assessment Program, Phase I: Needs Analysis
Deirdre Knapp and Roy Campbell

2005

Independent Evaluation of the California High School Exit Examination
Lauress Wise, Sunny Becker, Carolyn Harris, Leslie Taylor, and Lee Koger

2006

NAEP-QA Processing and Scoring FY06 Site Visits Interim Report—Final
Lori Schantz and Charlotte Campbell

2007

Application of Military Occupational Analysis Information to the Development of the ASVAB
Jennifer Geimer, Megan Shaw, and Steve Sellman

2008

Kentucky's Alternate Assessment Attainment Tasks: Findings and Recommendations from Administration Site Visits
Art Thacker, Emily Dickinson, Andrea Sinclair, and Leslie Taylor

2009

Interim Program Evaluation of the Army's Foreign Language Initiative
Ani DiFazio, Rod McCloy, and Teresa Russell

2010

U.S. Election Assistance Commission Work Products Evaluation
Peter Ramsberger and Kristina Handy

2011

Development of the Personal Care and Support Credential for the Direct Care Alliance
Maggie Collins

2012

Development of a Situational Judgment Test to Measure Integrity in Coast Guard Cadets
Michael Cullen and Amanda Koch

2013

Scenario-Based Workforce Planning: Implementation Guide
Gina Medsker

2014

Critical Analytic Thinking Skills: Development of Parallel Forms
Adam Beatty, Amanda Koch, and Matt Trippe

2015

An Evaluation of the Value of HR Certification for Individuals and Organizations
Dan Putka, Cheryl Paullin, Adam Beatty, Gina Medsker, Joe Caramagno, and Ryan Ginter

2016

Evaluating the Content and Quality of Next Generation High School Assessments
Sheila Schultz, Hillary Michaels, Rebecca Dvorak, and Caroline Wiley

2017

Analysis for Practice for the Physical Therapy Profession: Entry-Level Physical Therapists
Joe Caramagno, Sarah Cogswell, and Gordon Waugh

2018

Review of Situational Judgment Test (SJT) Prototype Development Process and Materials
Taylor Sullivan, Timothy Burgoyne, Rod McCloy, and Deb Whetzel

2019

Practice Analysis of the Coaching Profession
Gavan O'Shea, Andrea Sinclair, and Brittany Crawford

2020

Validation of ADEPT-15 for Selecting T&D Represented Leads at Southern California Edison
Chris Huber, Maura Burke, and Matt Allen

2021

Job Analysis/Competency Model Study for Early Childhood Education Lead Teachers
Emily Medvin and Jennifer Klafehn

2022

Evaluation of Colorado's K-12 Education Accountability System
Monica Gribben, Art Thacker, Emily Dickinson, Hye-Jeong Choi, and Emily Borawski

2023

Cyber Test Development
Chris Huber, Jeff Dahlke, Brenda Ellis, Matt Trippe, and Sean Baldwin

2024

Validity Framework for Kentucky's Assessment and Accountability System
Art Thacker and Emily Dickinson

2025

Science Minnesota Comprehensive Assessment Series IV Alignment Study
Emily Borawski, Rivka Revivo, Yachen Luo, Jiayi Deng, Jason Way, and Yvette Nemeth

FURTHER INFORMATION ABOUT HumRRO

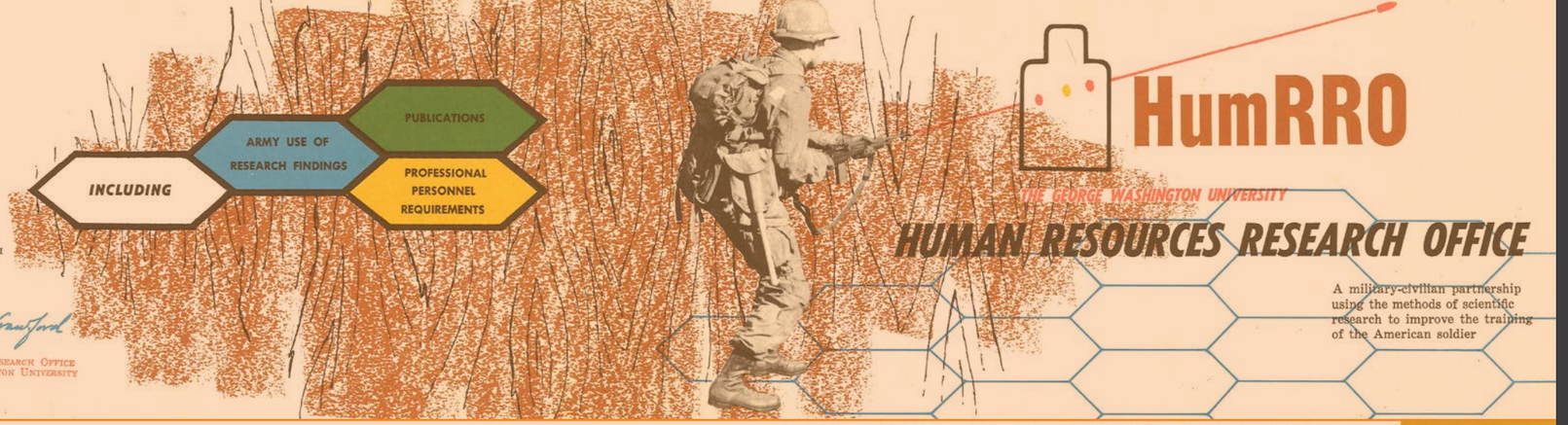
MAY BE OBTAINED BY WRITING TO:

DIRECTOR OF RESEARCH
OF ANY OF THE
RESEARCH GROUPS

OR

Meredith P. Crawford

DIRECTOR
HUMAN RESOURCES RESEARCH OFFICE
THE GEORGE WASHINGTON UNIVERSITY
P. O. BOX 3596
WASHINGTON 7, D. C.



HumRRO

THE GEORGE WASHINGTON UNIVERSITY

HUMAN RESOURCES RESEARCH OFFICE

A military-civilian partnership using the methods of scientific research to improve the training of the American soldier

1

WHAT IS HumRRO?

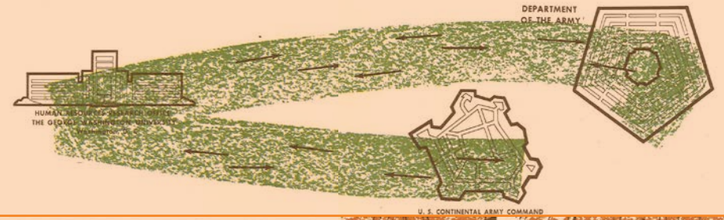
THE ANSWER IS **TWOFOLD**

HumRRO IS

A **CIVILIAN** ORGANIZATION . . . . . DOING PSYCHOLOGICAL RESEARCH ON **MILITARY**

TRAINING METHODS,
MOTIVATION
AND LEADERSHIP

The Human Resources Research Office is a part of The George Washington University, Washington, D. C. The staff includes approximately 100 professional research personnel, including 60 experimental psychologists who are Doctors of Philosophy, and about 200 technical and administrative specialists. All work as full-time members of the University staff, although many do not do their work on the University campus. Implicit in this University affiliation are the continuity and objectivity of research.



The Human Resources Research Office is a part of the Army research and development team. It operates under contract between Department of the Army and The George Washington University. HumRRO's work for the Army is monitored by the Human Factors Research Division, Office of the Chief of Research and Development, Department of the Army. Coordination also is effected through Headquarters, United States Continental Army Command, to which approximately 100 military personnel on regular duty with Human Research Units are assigned.

2

U. S. Army
AIR DEFENSE
Human Research Unit
Fort Bliss, Texas

U. S. Army
TRAINING METHODS
Division, HumRRO
Washington, D. C.

U. S. Army
LEADERSHIP
Human Research Unit
Presidio of Monterey, Calif.

U. S. Army
ARMOR
Human Research Unit
Fort Knox, Ky.

U. S. Army
INFANTRY
Human Research Unit
Fort Benning, Ga.

U. S. Army
AVIATION

WHERE IS HumRRO?

The Human Resources Research Office has central headquarters and the Training Methods Division in Washington, D. C., on the campus of The George Washington University.

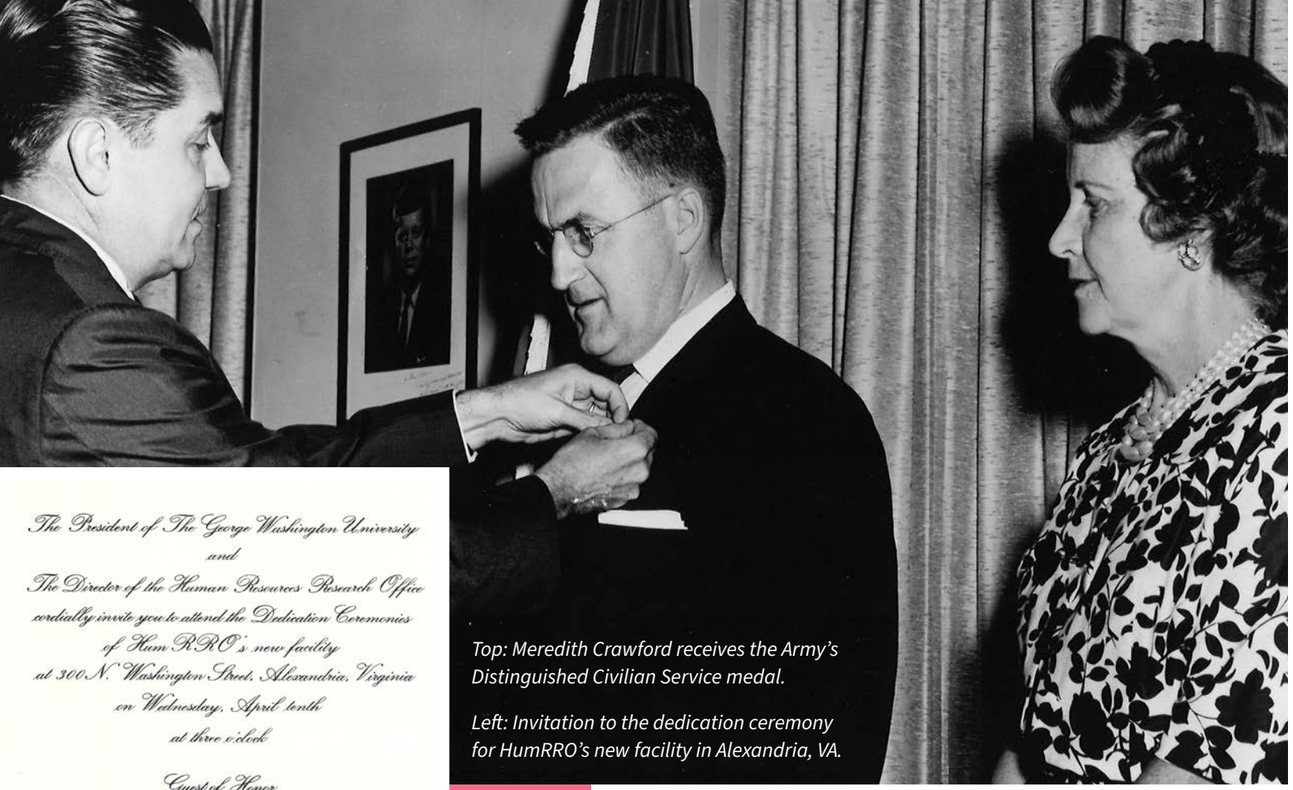
Five field units are located at military installations throughout the country. These five units are composed of civilian and military personnel, headed respectively by a Director of Research (who reports to the Director of HumRRO) and a Military Chief (who reports to the Commanding General, Continental Army Command).



In research projects, members of the professional staff do their work both at home bases in the United States and at foreign stations — wherever pertinent data are available. The pursuit of first-hand information takes HumRRO psychologists to such places as Alaska, Greenland, Europe, and the Far East.

CHAPTER 2.

1961—1970



Top: Meredith Crawford receives the Army's Distinguished Civilian Service medal.

Left: Invitation to the dedication ceremony for HumRRO's new facility in Alexandria, VA.



HumRRO *Moves to Alexandria*

THE UNIVERSITY'S Human Resources Research Office, which has operated for more than 11 years on campus in Building D, will be moved about January 1 to the Fidelity Building now under construction at North Washington and Queen Streets in Alexandria.

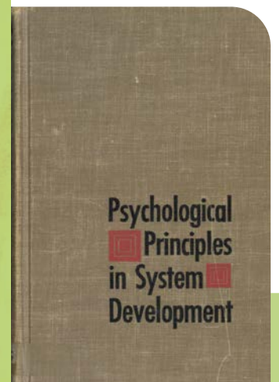
University President Thomas H. Carroll and Lt. Gen. Arthur G. Trudeau, Chief of Research and Development, Department of the Army, made a joint announcement of relocation plans, pointing out that the Army contract with the University will remain virtually unchanged. General Trudeau said research results of the work done under this contract has been used by the Army in training, motivation, leadership, and man-weapons analysis. The present program involves nearly 30 research tasks.

Space released by the move to Alexandria will be used for classrooms and academic offices.

40 THE FEDERALIST

Article from The Federalist, *published by GWU from 1954-1963, announcing HumRRO's move.*

Fall 1962



EVOLUTION AND ADJUSTMENT

AT THE START of HumRRO's second decade, Meredith Crawford was awarded the Army's Distinguished Civilian Service Medal. The citation said in part:

> *[Dr. Crawford's] professional attainments as a researcher and educator, his administrative ability, and his dedication to the objectives of the United States Army have combined to make [his] achievements during the past decade clearly exceptional, reflecting credit upon both the military service and scientific community.*

Among the HumRRO accomplishments cited in the accompanying report were the following:

- TrainFire, a new program to teach soldiers target detection and rifle marksmanship skills,
- Training materials for guided missile fire control operators,
- Improved training methods for tank crews,
- Production of 25 leadership films used throughout the Army for the training of officers,
- Procedures for evaluating the performance of helicopter pilots.

In 1962, HumRRO's evolutionary concept of a systems approach to training was published as a chapter by Meredith Crawford in R. N. Gagne's volume *Psychological Principles in System Development*.

The approach involved seven steps, including:

1. Developing a human factors systems analysis model of the job setting;
2. Developing a job model that specifies the inputs and outputs;
3. Specifying the knowledge and skills required of the job;
4. Determining the instructional objectives;
5. Constructing the training program itself;
6. Developing proficiency tests; and
7. Evaluating the training program.

Although seemingly commonplace in today's environment, this was one of the earliest explications of the Instructional Systems Development process.

In March of 1963, HumRRO headquarters moved from the campus of George Washington University to its new location at 300 North Washington Street in Alexandria, Virginia. This move allowed for the consolidation of operations under one roof and provided additional space for laboratory facilities. At the same time, building space was freed up on campus for use as classrooms and offices. The dedication ceremonies were held on April 10, 1963, and included the following remarks by the Assistant Secretary of Defense, Finn Larsen:

> *We in the Army have more than ten years of experience of the solid contributions which HumRRO has demonstrated to result from use of scientific techniques in solution of Army problems of training, motivation, morale, and leadership. On the basis of this experience, we place HumRRO as a major member of our human factors R&D team ... HumRRO, largely through its close and intimate association with the Army in the field, is able to know and be guided by the tactical purposes of the training which you assist in designing. While your head may be here in these new facilities, your real muscle and strength remain in the field with the Army.*

Over the first seven years of HumRRO's second decade, the size of the research and support staff remained relatively stable at about 250–300 employees. By 1967, there were seven divisions:

Division 1	Systems Operations	Alexandria, VA
Division 2	Armor	Ft. Knox, KY
Division 3	Recruit Training	Presidio of Monterey, CA
Division 4	Infantry	Fort Benning, GA
Division 5	Air Defense	Fort Bliss, TX
Division 6	Aviation	Fort Rucker, AL
Division 7	Language & Area Training	Alexandria, VA



As of July 1, 1967, HumRRO's contract with the Department of the Army was modified to allow it to take on other sponsors. This decision was agreeable to both parties. HumRRO could seek to expand its contract base beyond those funds made available to it by the Army. At the same time, indirect costs were shared by all of those supporting agencies, lessening the financial burden on the Army. On the same day that this new agreement went into effect, HumRRO took on its first non-Army client, the Post Office Department. This was followed one year later by the first non-government contract with Ford Motor Company.

To mark the end of the exclusive Army relationship, Meredith Crawford issued a report entitled *A Perspective on the Development of HumRRO.* The report presents many details about the organization and its development, including the fact that some 1,771 persons had been employed full- or part-time during HumRRO's 12 years of existence. Crawford traced the increasing expense associated with personnel, including the fact that over the course of HumRRO's history the salary of a new Ph.D. had doubled from $6,000 in 1952 to $12,000 in 1967.

Another transition was soon to come. On September 1, 1969, HumRRO separated from the George Washington University and was incorporated as an independent nonprofit research and development center. After almost 20 years, the "O" changed from "Office" to "Organization." These changes were to the mutual advantage of both parties. The University had been criticized by accrediting agencies for its lack of control over HumRRO's research activities. At the same time, HumRRO was chafing under the administrative requirements of the University, which were found to be restrictive in a now competitive environment.

Top right: Assistant Secretary of Defense Finn Larsen speaks at the dedication of HumRRO's new headquarters.

Bottom right: Articles of Incorporation for the Human Resources Research Organization (HumRRO).



DISTRICT OF COLUMBIA

CERTIFICATE

THIS IS TO CERTIFY that there were received and accepted for record in the Office of Recorder of Deeds, D. C., Corporation Division, on the 16th day of April, 19 69. Articles of Incorporation of HUMAN RESOURCES RESEARCH ORGANIZATION (HumRRO)

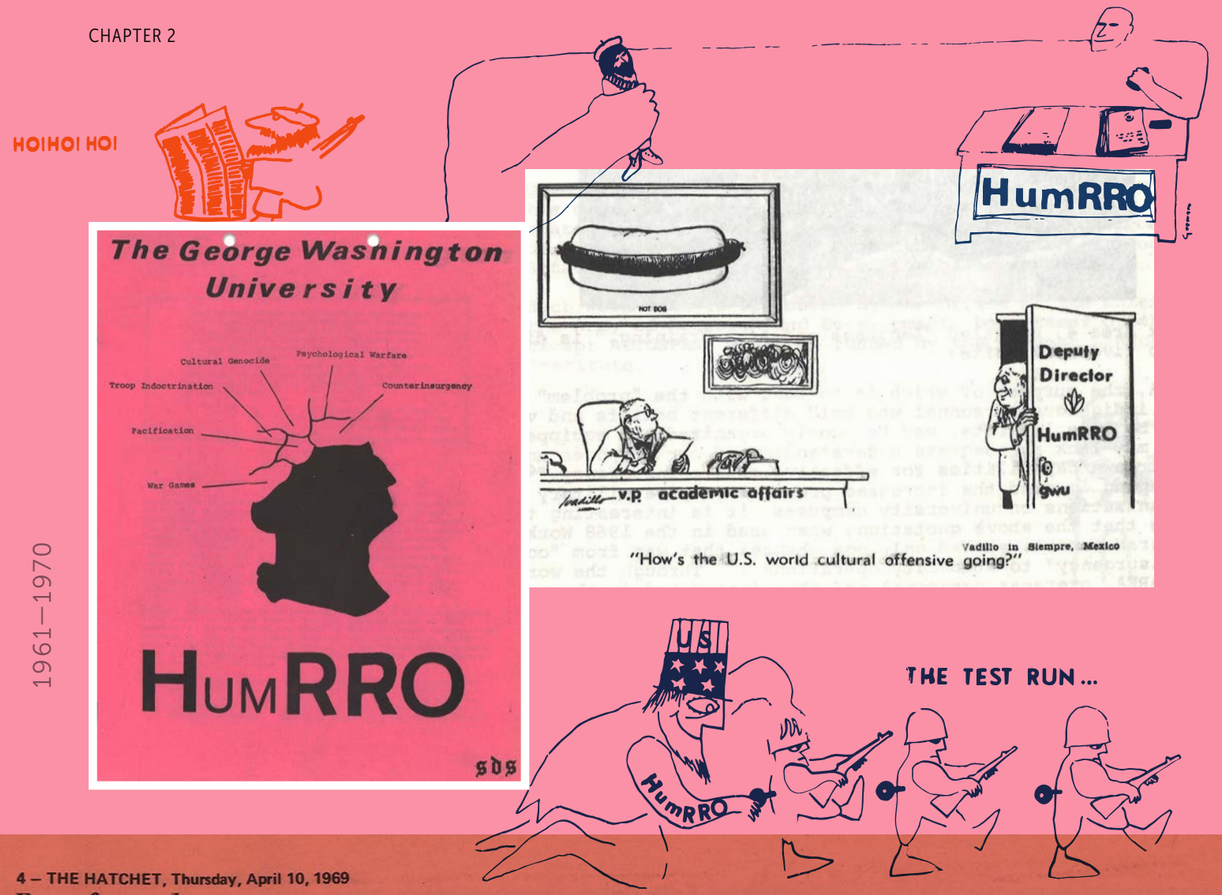
WE FURTHER CERTIFY that the above named corporation is duly incorporated and existing under and by virtue of the Code of Laws of the District of Columbia and authorized to conduct it's affair ~~transact business~~ in the District of Columbia as of the date hereinafter mentioned.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of this office to be affixed this 28th day of January, 19 81

Recorder of Deeds, D.C.
MARGURITE C. STOKES
Acting Recorder Of Deeds, D.C.

OFFICE OF RECORDER OF DEEDS, D.
CORPORATION DIVISION
SIXTH AND D STREETS, N. W.
WASHINGTON, D. C.

Assistant Superintendent of Corporat



4 – THE HATCHET, Thursday, April 10, 1969

Fear - from p 1

HumRRO Dealt in Experiments of Fear

though he continues to receive messages....

New Army recruits, not yet in Basic Training, were given a simple English reading test and were checked for meeting standard Army criteria of physical and mental fitness. A group selected at random from those meeting this screening criterion was transported by bus 85 miles to Hunter Liggett Military Reservation (HLMR), a large, desolate mountain area, undeveloped, dry, and rugged....

Research on this phase of the project known as FIGHTER, the HumRRO designation for the training experiments conducted

subjects were told that "a probably fatal air bubble had been produced accidentally in their blood." According to the story, McFann indicated that this experiment was dropped because it was unconvincing.

As of April 1968, Task FIGHTER was an active project. In "A Perspective On the Development of HumRRO, reissued at that time, FIGHTER was one of the projects listed for Division 3, and described as the

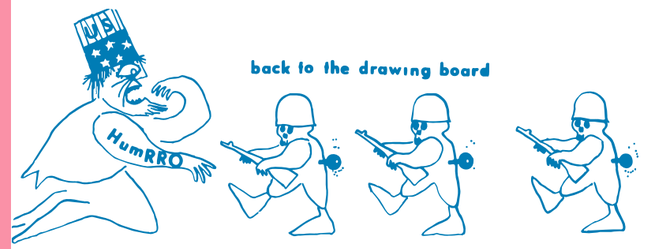
combat-in-cities, and so forth." So reads the summary.

In another test on psychological stress, by Robert D. McDonald and Kan Yagi, it was reported that "Seventeen subjects were individually stressed in a military field problem in which each was led to believe that he had accidentally caused serious injury to a companion through misuse of explosives." One wonders why the same

attempts were just gestures for sympathy, or an excuse to go to the hospital in the middle of the night. But The Washington Post, on March 19, noted that several of the prisoners now on trial had actually slashed their wrists with razor blades, reportedly offered to them by the guards. According to the Post, a pre-trial investigation report by Capt. Richard J. Millard "recommended that the 27 soldiers either be discharged for

How can this rate be called a normal occurrence? Did the Presidio guards offer razor blades as part of another "stressful" experiment? Were the crowded conditions, where 140 men were crowded into space for 88 and often short-rationed as well, all part of another stress experiment? And are the charges of mutiny perhaps nothing more than a cover-up of the abortive results of HumRRO testing?

Discussions regarding separation of the two entities were held over a two-year period. Agreements were being finalized during a period of campus unrest across the country. And it was at this time that The George Washington University chapter of Students for a Democratic Society (SDS) took on HumRRO as a cause. SDS circulated pamphlets around the campus decrying the University's ties to HumRRO. The cover of one of these showed a profile of George Washington with an exposed brain. Lines pointing to various parts of the brain were connected to labels such as "psychological warfare," "cultural genocide," and "pacification." HumRRO was accused, both by the SDS and through the campus newspaper *The Hatchet*, of unethical research practices. Most of the charges centered around



Left page: Illustrations from the SDS pamphlet on HumRRO. Below: GWU student paper, The Hatchet, *announces the separation.*



EXTRA The HATCHET EXTRA

VOL. 65, NO. 44 The George Washington University Thursday, April 10, 1969

GW, HumRRO Sever Ties

THE PLANNED SEPARATION of the Human Resources Research Office (HumRRO) from the George Washington University was announced today by University President Lloyd H. Elliott. Steps are now being taken by Dr. Meredith Crawford, Director of HumRRO, to establish HumRRO as a separate corporation.

HumRRO is a research organization of 260 employees, primarily psychologists and sociologists, with two divisions in Alexandria, Va., and others at Ft. Knox, Ky., the Presidio of Monterey (Calif.), Ft. Benning, Ga., Ft. Bliss, Tex., and Ft. Rucker, Ala.

The separation was requested by HumRRO "in order to give the Office the administrative and fiscal flexibility to pursue an expanded research and development program in the fields of training and education." HumRRO will

development have been particularly useful in vocational education, and their research into better methods of training non commissioned officers for leadership responsibilities has been picked up and applied by such diverse groups as the National Methodist Board of Education (for the training of church school teachers), the Boy Scouts of America, and the Upward Bound program of the Oregon State Prison.

Since 1967, HumRRO has done research for various other sponsors in addition to the Army, including the U.S. Post Office Department, the Louisiana Regional Medical Program, the Ford Motor Company, the U.S. Coast Guard, and the Office of Naval Research.

HumRRO, however, has had very little relationship with the University's instructional and research program. The 1967 Evaluation Report of George Washington University by its

work unit **FIGHTER IV** (see earlier description on page 16). The paper reported that the research had been the subject of complaints to the American Psychological Association, which was true. Neither the SDS nor *The Hatchet*, however, mentioned that APA's ethics committee had reviewed the research and absolved HumRRO of any violation of ethical or moral standards. *The Hatchet* also reported that a Private Richard Bunch had written his mother that he had "died twice and been reincarnated as a warlock." The "journalist" suggested that there might be some connection to the Fighter experiments. Unfortunately for the paper, Bunch would have been 10 years old at the time the stress research was conducted. Finally, *The Hatchet* reporter suggested a connection between HumRRO's work and a sit-in at the Army's San Francisco stockade the previous summer. In truth, HumRRO had no presence at, or connection to, that location.

In the end, the connection between the student protests and the decision to sever ties with the University was tenuous at best, although the timing of events may have made it seem otherwise.

The initial officers of the newly incorporated entity were Meredith Crawford, President; William McClelland, Secretary; and Charles W. Smith, Chief Financial Officer. The organizational meeting of the new board of directors was held on September 23, 1969 at the headquarters building. The functions of the board, as outlined by Dr. Crawford, were to provide advice on the formulation of corporate goals and means to achieve them, evaluate progress towards reaching the enunciated goals, and provide long-range financial guidance. An Executive Committee was also formed, consisting of the chairman and vice chairman of the board and one other board member who was not an employee of the corporation. The purpose of this committee was to provide short-notice input and advice under such circumstances as may be required. HumRRO's net worth at this time was reported to be $73,000.







FACTORS AFFECTING PERFORMANCE

HumRRO's WORK IN THE HUMAN FACTORS ARENA during the 1960s spanned a wide range of subjects including man-machine interaction and man as a machine. As is typically the case in the research conducted by HumRRO staff, a hands-on approach was often required to fully analyze and understand the equipment, conditions, or requirements under study. One example of this approach was **PROJECT COLDSPOT**, which examined the cold weather operational training of infantry forces in the Strategic Army Corps. As a first step, researchers conducted a survey of human factors in military training in cold weather conditions. The survey included a review of the military and scientific literature, interviews with experts in the field of cold weather operations, visits to operating units throughout the far north, attending classes at the Army's Cold Weather and Mountain School, and conducting exploratory work with U.S. forces in Greenland. Researchers created the "Small-Unit Cold Weather Checklist," which enabled observers to record many details of individual and group activities in training exercises. Such details included the clothing worn, equipment carried, skills used, and techniques employed to accomplish mission goals.



The checklist was used during a 10-day training exercise called Operation Little Bear. This maneuver involved two battle groups acting in aggressor and defender roles. The site was the Lake Louise-Gulkana area, some 170 miles northeast of Anchorage, Alaska. Three HumRRO researchers recorded the actions of the troops involved, including those operating in command roles. The length of the exercise allowed several opportunities for individuals to code the same events as a check of rater reliability, which was found to be very high. In addition to the observations, the researchers conducted interviews with both command and front-line personnel to obtain their insights into the various issues surrounding cold weather operations that had been uncovered in preliminary analysis. Several major findings resulted from these efforts, including:

- Soldiers who used snowshoes to travel cross-country did as well as those using skis. This proved true despite the fact that, prior to the exercise, all troops were given 66 hours of ski training and only 2 hours of instruction and practice in snowshoes.
- Navigational errors were frequent in this unfamiliar and unfriendly environment.
- Techniques of weapon use and individual combat skills were seemingly shoved to the back burner in favor of weather-related skills.

These findings led to the suggestion that training related to operations in cold weather be conducted in a functional context—on site as opposed to in a classroom. Further, the priorities in such training should be:

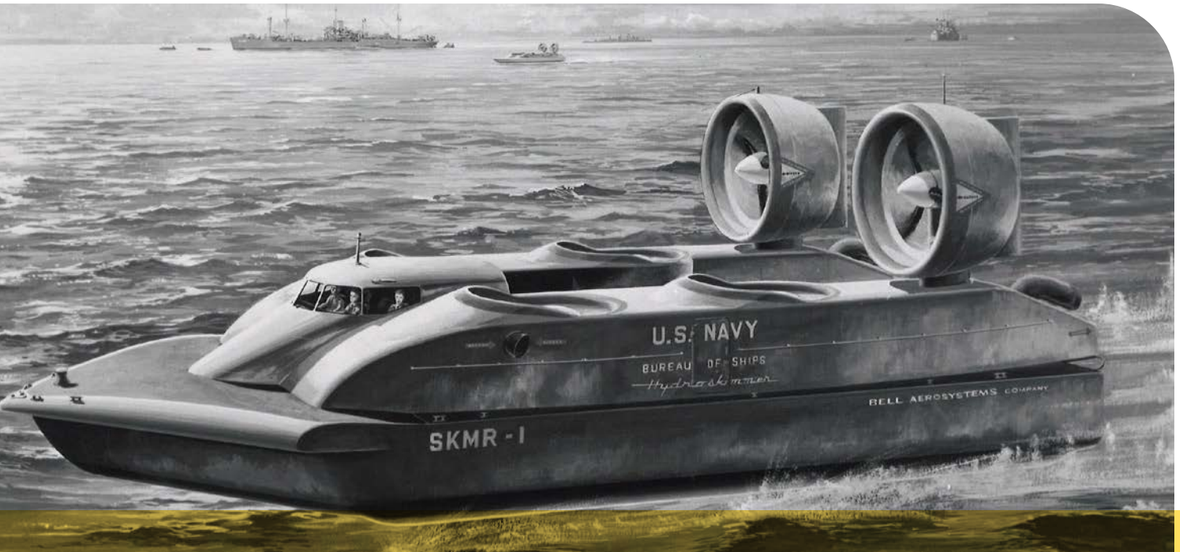
1. Tactical adaptations to cold weather;
2. Movement skills;
3. Proper use of cold weather clothing and equipment, and
4. Techniques of escape, evasion, and survival.

Left page: HumRRO Technical Report 86, Cold-Weather Operational Training of Infantry Forces in the Strategic Army Corps. Photos from Exercise Little Bear, 1959-1960.

Another issue of key interest to the Army during this period was that of endurance. One offshoot of improving equipment was that it could function for longer periods of time. This put the onus on the operators of such equipment to keep up. A central concern of HumRRO's Armor Division was with the kinds of skill degradation that would occur as tank crewmembers operated for longer periods of time without substantial rest (**PROJECT ENDURE**). HumRRO used a variety of techniques to examine this question, including the conduct of two experiments. The first was laboratory-based, and tested the impact of sleep deprivation, starting time (day/night), and task rotation on job performance (simulated driving, surveillance tasks). In general, researchers found that major performance decrements occurred when tankers were asked to perform a simulated mission over a 48-hour, uninterrupted period. In fact, during the middle of the second day, researchers struggled in vain to keep the soldiers awake at all. Job rotation was found to reduce decrements in driving, but not in surveillance tasks.

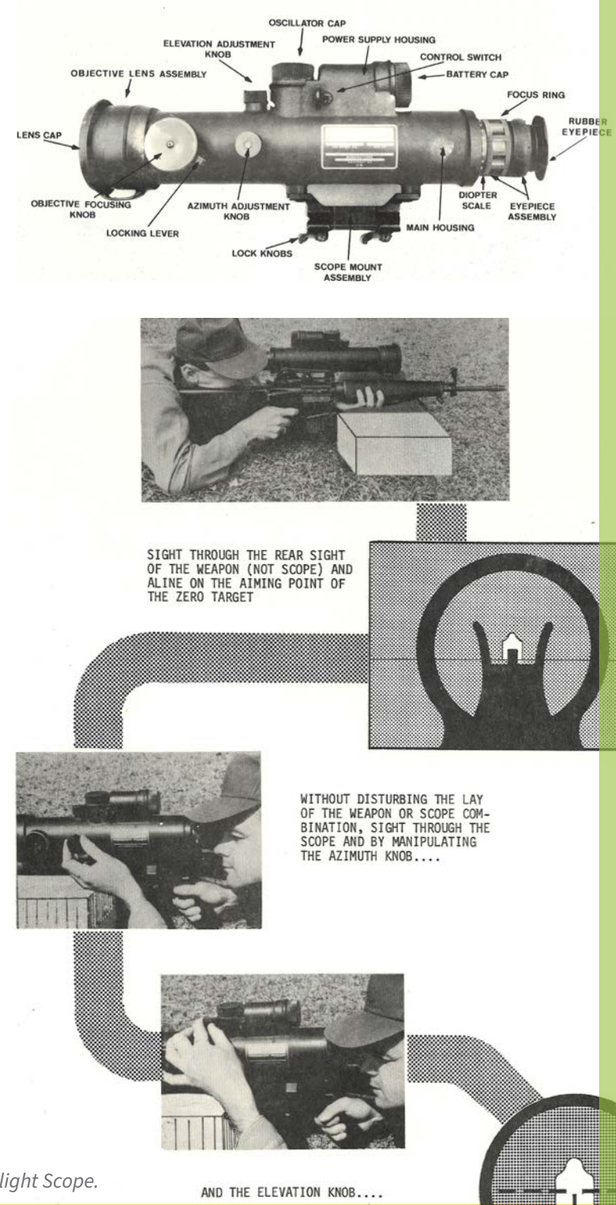
A follow-up experiment took place in the field. It involved a day and night tactical exercise, including offensive, defensive, and retrograde movement. Experimenters studied the full range of tank crewman tasks, including gunnery, surveillance, communications, driving, and maintenance. In this case, few differences were found between continuously operating troops and those who were allowed to rest. In fact, one of the major findings was that there was a low level of performance across the board in such areas as tank gunnery, surveillance, and operation of searchlights and night vision devices. The lack of correspondence between the laboratory and field studies led researchers to doubt the efficacy of the former when studying real life issues regarding endurance. They concluded that, "… (We) are faced with a need to develop new tasks and situations, intermediate between the laboratory and the real world. These conditions need to be realistic enough to provide the motivation and job duties of the real world, but still simulated to the extent that they can be accomplished at less cost."

Rendering of the amphibious Air Cushion Vehicle. Photo Credit: Bell Aerosystems Company.



PROJECT OVERDRIVE focused on the newly emerging amphibious Air Cushion Vehicles (ACVs) being considered for use in a variety of Army operations. HumRRO staff conducted an exhaustive evaluation of the systems' capabilities, design characteristics, operating requirements imposed by missions, and the environment in which they would be deployed. The researchers used engineering reports, operations analysis, environmental studies, and interviews with operators. In the hands-on spirit, researchers even drove the ACVs themselves to gain a better understanding of the challenges presented to operators. They studied different configurations of ACVs to determine which would best suit Army needs. In the end, the researchers concluded that this new type of vehicle presented many unique problems from both a training and operational perspective. The ACVs were found to be highly sensitive to wind, waves, surf, hills, grades, depressions, surface conditions, and obstacles. Because of their ability to travel off-road, the vehicles presented new land navigation challenges for operators. HumRRO was able to discern which type of vehicle would be most amenable to Army use, but concluded that substantial training time would be required, and that only senior enlisted personnel could handle the demands involved while also functioning in an operational environment. This study helped convince the Army that the ACV wasn't for them, and research and development efforts ceased in 1964.

Several HumRRO projects concerned human factors issues in night operations. One example was **PROJECT NIGHTSIGHTS**, whose goal was to identify the crucial human factors problems in the use of night observation devices and to develop effective training techniques for their use. Project staff carried out task and device analyses for the AN/TSS-7 Night Observation Device and developed training programs in several formats. Research indicated that soldiers who were shown a videotape on the operation of the device performed better in hands-on tests than did those who received stand-up training. However, when



Images from HumRRO's job aid, A Pictoral Program for the Starlight Scope.

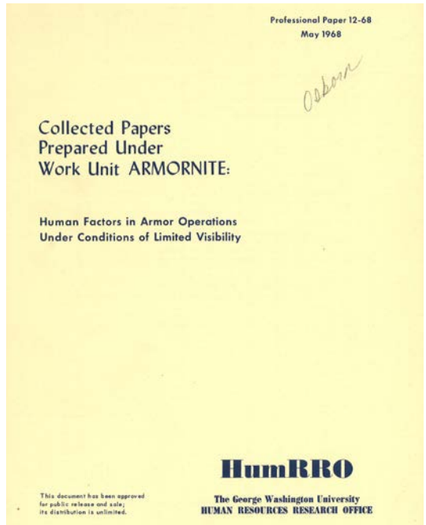
supplied with a pictorial guide as a job aid, both groups performed equally well. The major concern uncovered by the researchers was the inherent limitations of human beings to process the information the device provided. Subsequent laboratory studies were conducted to document these shortcomings. One conclusion drawn from this work was that future design of devices intended to enhance performance must take into account the limited capabilities of the operators of those devices.

PROJECT ARMORNITE was a long-term effort to improve the performance of tank crews operating at night. Armornite staff conducted a wide range of research addressing both practical and esoteric issues. Some examples included:

- Survey of human factors in military night operations
- Illumination and speed as factors affecting tank travel
- Recognition of vehicles by observers looking into a searchlight beam
- Absolute identification of Munsell hues under red illumination
- Flash localization and reticle design
- The effects of observer location and viewing method on target detection with the 18-inch mounted searchlight

During the 1960s, Army Aviation underwent a great growth, both in terms of numbers of aviators and types of missions. The Army eventually had more pilots than all other services combined. And it was in this era that such systems as armed helicopters, airborne missiles, and electronic surveillance systems came into being. Because of the extremely demanding nature of the low-altitude environment in which most Army aviation missions took place, there was a burgeoning emphasis on human factors problems and their solutions. The HumRRO Aviation Division worked closely with the Army Aviation Test Board and was responsible for the human factors portions of their aircraft and system test programs. These activities varied from evaluation of the cockpit layout of the Army's Caribou aircraft to the operational suitability test of various systems.

Because of the low speed of most Army aircraft, the standard doctrine required the aviator to avail himself of such cover and concealment as might be provided by extremely low-altitude flight—called nap-of-the-earth flight. In **PROJECT LOWENTRY**, HumRRO researchers examined many human factors associated with an aviator's ability to navigate in that demanding environment. For example, flying at 100mph at 50 feet and less will produce visual and angular velocities, as one views the extra-cockpit world, that may be many times greater than those experienced by a pilot flying at much greater speeds and altitudes. In addition, the field of view one has of the terrain is obviously much more restricted at nap-of-the-earth levels. Consequently, the acquisition and processing of visual cues for navigation at low altitudes can be a very difficult task and can make rapid and correct decision making a major consideration. HumRRO researchers conducted a wide-ranging series of investigations covering such factors as the effects of map scale on navigation, the types of information to be displayed and their manner of presentation on maps designed for low-level flight, accuracy of "eyeball" estimates of angle and map position, as well as the use of automatic computing navigation displays. Implications of such factors were taken into account in the design of training programs for low-level navigation.


Professional Paper 12-68
May 1968

Collected Papers
Prepared Under
Work Unit ARMORNITE:

Human Factors in Armor Operations
Under Conditions of Limited Visibility

This document has been approved for public release and sale; its distribution is unlimited.

HumRRO
The George Washington University
HUMAN RESOURCES RESEARCH OFFICE

Another function HumRRO performed for the Army fell under the rubric of Technical Advisory Services. These were studies of a more focused nature that were outside the long-term, in-depth research and development conducted under work units. One example of this was an examination of a wide range of existing data and information related to the reactions of humans to traumatic and extremely stressful situations. The goal of the effort was to provide the Army with the best information available regarding the possible behavior of soldiers on the "nuclear battlefield," as well as guidance as to how to prepare them for such duty. In many respects, this work can be viewed as an extension of both Desert Rock and the Fighter studies, using a scholarly and less experimental approach. Researchers examined documents describing the behavior of people under aerial bombing and in disaster situations (e.g., floods, fires, earthquakes). They also reviewed studies of the reactions of military personnel in combat and the literature on the psychological mechanisms involved in coping. Based on this information, the investigators developed a model for estimating the extent of psychological casualties that could be expected in the event of tactical nuclear battles, allowing for such variables as the intensity of the combat and time served under combat conditions. Among the conclusions reached were:

(a) People held up remarkably well under the severest form of stress;

(b) There was no evidence to suggest that soldiers would react differently on the nuclear battlefield than they had in conventional warfare;

(c) Factors related to casualty rates included fatigue, isolation, and ambiguity;

(d) Primary combat group support was posited as the most important factor in sustaining soldiers under conditions of extreme stress; and

(e) Soldiers needed training to prepare them to fight in a nuclear environment and cope with the associated stress.


LET'S TAKE A LOOK AT...

NEW PROJECT: TASK LOWENTRY

BY LT. COLONEL ARNE H. ELIASSON
CHIEF, HRU, FT. RUCKER, ALA.

Improving navigation techniques for low level flight of rotary wing and fixed wing aircraft and developing the training methods to teach these skills to Army aviation personnel are the objectives of Task LOWENTRY. This is the newest research task approved by Department of the Army for the U.S. Army Aviation Human Research Unit, Fort Rucker, Ala.

IT MUST BE OBVIOUS to nearly everyone that to operate successfully or even to survive on the modern battlefield, Army aircraft will have to remain at altitudes considerably lower than was necessary in the past.

THIS IS PARTICULARLY TRUE of aircraft involved in aerial combat reconnaissance, helicopter-borne assaults, surveillance of areas occupied by hostile forces, and tactical air support. Low level operations are necessary for the element of surprise, to avoid detection and interception, but most of all to minimize the effect of enemy air defense weapons.

IT MUST BE equally obvious that low level flight presents problems to the aviator and observer not normally present in flights at altitudes of 500 feet or above.

WHILE FLYING 500 FEET or higher above the terrain, an aviator can usually look ahead on his line of flight to detect a check point and compare it several times with his map to avoid errors. He can put his eyes in the cockpit for relatively long periods of time to compute and decide what adjustments to make to maintain the desired course. At, or above, the 500 foot terrain clearance level, features such as towns, roads, and bodies of water are in view for at least several minutes. Low relief features are not in profile nor easily discernible.

AT LOW LEVEL FLIGHT a different situation exists that will require the aviator to change some of his high level pilotage procedures. Now, only those features in profile will be available for navigational use for a matter of minutes. Flat terrain features such as towns, roads, and water features will be available for only a matter of seconds — except in the rare event of "too large to miss" objects or lineal features coinciding with the line of flight.

THE ROAD INTERSECTION that was seen for a minute or two at 500 feet may be passed 200 yards to the left out of view behind vegetation and around a curve. Even if the intersection is approached over cleared land it is in view for only a few seconds making map reference and course heading adjustments difficult.

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TASK/CONTINUED

THEREFORE, unless there has been detailed planning before the mission, the aviator is continually behind in his navigating. Providing he has been able to recognize a terrain feature, by the time he computes what correction to make he is several miles away from where the correction may no longer be valid.

LT. COLONEL WARREN P. PAULEY (USA, Retired), Task LOWENTRY Research Technician, says, "The key to successful low level navigation is the careful and detailed planning which is done prior to the flight. Every minute spent on flight planning is that much more assurance (to the pilot) that the mission will be a success."

WHEN FLYING at "nap of the earth" altitudes the old procedures of using directional headings from fix to fix may be an unsure way of arriving at the destination. The axiom, "The shortest distance between two points is a straight line," may not apply. For the nap of the earth aviator this may have to be revised to something like, "The surest route between two points is the route with an adequate number of unmistakable fixes."

THE RESEARCH STAFF of Task LOWENTRY, headed by Robert H. Wright, HumRRO Research Associate, has begun to gather pertinent literature and reports of previous studies. There are a number of techniques that have been found that hold promise of increasing the effectiveness of low level navigation. These have been gleaned from literature provided by both domestic and foreign military services as well as civilian researchers and documents.

TO SECURE UP-TO-DATE information on what units in the field are doing in this area, a questionnaire was compiled by the LOWENTRY staff and sent to nearly all of the aviation and transportation helicopter companies in the active Army. The data furnished by these questionnaires will be analyzed to determine where the strong points and weaknesses are in the present methods and techniques.

FINDING as many techniques as possible is only the first step, however. The future stages of LOWENTRY will include development of a program of instruction that will provide the Army aviator with the ability to:

■ Utilize effectively all of the useful navigational techniques, and to know their advantages and disadvantages.

■ Determine which techniques will be most effective for a particular mission.

■ Program all of the in-flight activities of the crew in a manner that will give him the best chance to successfully accomplish the mission.

FACTORS, other than those discussed above, will have to be considered in Task LOWENTRY. These include:

■ Determination of the desirable characteristics of a suitable map for low level flight.

■ Evaluation of the effect of electronic aids to navigation on low level navigation procedures.

■ Determination of the changes and improvements in Army aircraft instrumentation that have a bearing on low level navigation.

EVERY EFFORT will be made to ensure that no aspect concerning the problem is overlooked. The members of Task LOWENTRY are fully aware of the im-

TASK LOWENTRY: THE FOURTH IN A

MILITARY LEADERSHIP

A SUBJECT OF OBVIOUS CRITICAL CONCERN to the United States Army was, and continues to be, that of leadership. What are the characteristics that make effective leaders? What are the best means of identifying the skills and abilities required of persons who are responsible for directing others towards the safe and effective attainment of mission goals? And how can those skills and abilities best be imparted to those who have or are rising to positions of leadership? Such questions were the subject of a variety of studies carried out by HumRRO researchers in the decade of the sixties, using a number of reality-based, hands-on approaches.

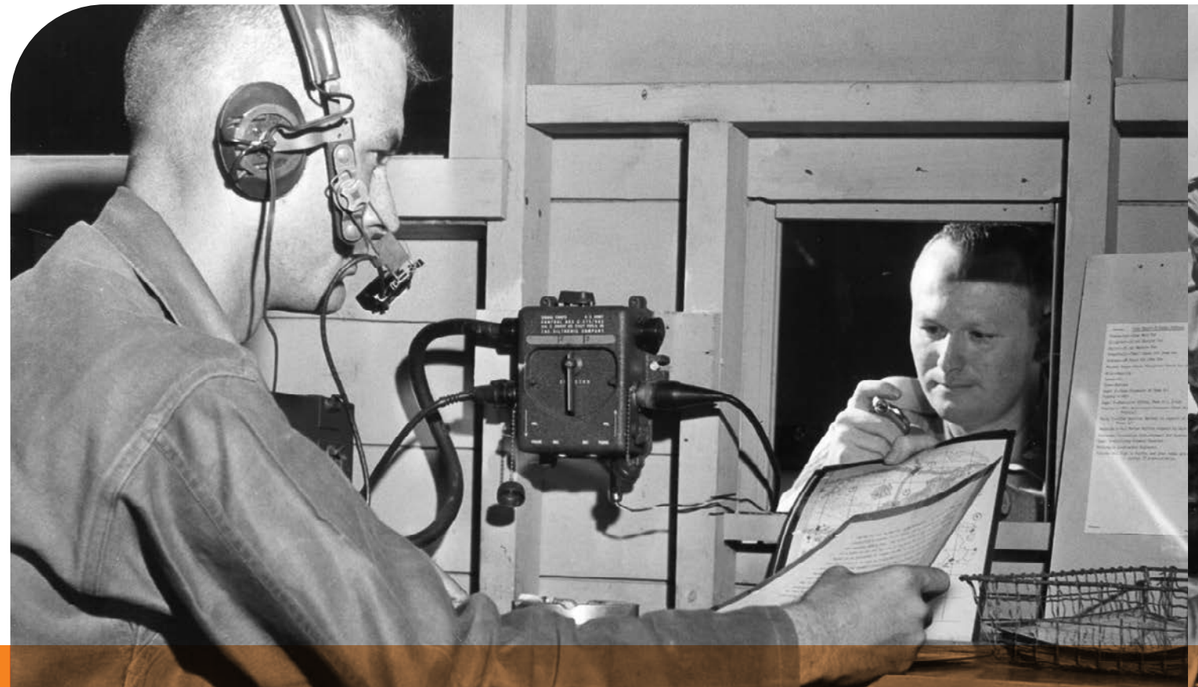
In **PROJECT SPANOCON** the initial focus was on identifying real world problems that posed the greatest difficulty for those in leadership positions. Researchers interviewed Army officers with experience in both World War II and Korea and asked them to describe the content of problems they faced with the greatest frequency and which caused them the most difficulty. When the input was examined, three classes of problems emerged: tactical, logistical, and those involving personnel. In terms of difficulty, the latter two areas were judged to provide the greatest challenge.

To further investigate these concerns, project staff designed a simulation that attempted to incorporate a variety of elements experienced by leaders in the field. Officers were placed in a room with a tank radio. A monitor, who was conducting the session, sat in an adjacent room and was able to communicate with the officer via the radio and provide him with maps and other instructions through a slot in the wall between them. A series of situations were then presented through simulated, pre-recorded communications from the officer's commander, supplementary instructions from the monitor, and maps showing the position of the officer's men, adjacent units, and the enemy. The officer's job was to take appropriate actions by issuing orders, acknowledging transmissions, reporting, and so on. The monitor recorded all of his communications, and judges later rated the subject officer's performance.

This simulation technique was used for a variety of purposes. On the one hand, it served as a training mechanism, in that the feedback provided to the participants allowed them to identify weaknesses as well as avenues for further development. The researchers also used the data to investigate information handling processes and capacities. The results led them to further examine what impact training in information handling principles would have on performance, which in turn led to recommendations for incorporating such training in future courses.

In three separate projects, HumRRO researchers sought to identify the knowledge, skills, abilities, and characteristics of leaders at various levels based on real-world experience. **PROJECT NCO** started with a literature review of junior NCO responsibilities. Project staff then reviewed programs and methods in use at the time in NCO academies and collected critical incident data of junior NCO performance in units of varying types and locations. From the information gathered, they developed a detailed job description, as well as a proposed training text and reference manual. The Berlin Crisis of 1961, which required a partial troop mobilization, interrupted the NCO research. Army leadership turned to HumRRO for advice and assistance on how best to quickly implement the course that had been in development. HumRRO helped the Army institute a two-week Leader Preparation Course (LPC) that was given between Basic Combat Training and Advanced Individual Training. The first step was to conduct a training institute for the benefit of those Army personnel in the field who would actually be delivering the course. Stand-up training was supplemented by an automated package of tapes, filmstrips, programmed texts, and other ancillary materials. By early 1962, Leader Preparation Schools were in operation at eight sites across the country. Several other sites were added later, with a trainee output rising to approximately 10,000 NCOs per year. The package was subsequently used as a model for foreign armies, other components of the U.S. Army, and civilian agencies (e.g., the Boy Scouts).

An officer reviews a map while receiving programmed communications from subordinate units involved in combat.





U.S. Army photography from Project NCO.

As part of the training under Project NCO, a student instructs others on the proper method of assembling an automatic rifle.



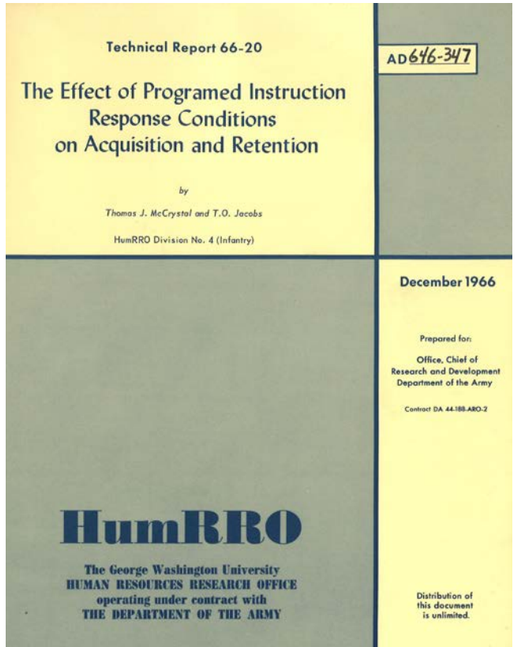
Researchers used a similar methodology to develop a 16-hour leadership course for platoon leaders (**PROJECT LEAD I**). They conducted a systematic analysis of platoon leader behavior. In part, the process involved interviewing men from 42 different platoons in an effort to identify examples of leadership at this level. Content analysis revealed six key areas: defining the tasks, pre-task motivation, post-task motivation, handling disruptions, getting information, and NCO use and support. The course structured around these dimensions included lectures and role-plays based on real-life critical incidents. The new course received very positive evaluations and was adopted for use in the ROTC program.

Army personnel recognized the Vietnam conflict as "a small unit leader's war." HumRRO was tasked with conducting research and development efforts to improve combat leadership in small infantry units (**PROJECT LEAD**). Researchers collected expert interviews and reviews of written descriptions of small unit actions from World War II through Vietnam. These yielded 6,500 performance, knowledge, and skill dimensions that were subsequently grouped into 41 major subject areas. After matching these areas against current training curricula and field manuals, the investigators identified major gaps and areas in need of wholesale revision. The resulting outline of critical combat performance required of infantry rifle platoon leaders was designed for use by Army personnel in the revision and updating of training. Among other things, the authors concluded that "the outstanding cooperation and assistance obtained from the U.S. Army Infantry School military experts during [this] research was evidence of increasing recognition that systematic analysis of a specific job, or jobs, is a primary step in the design of effective training."

In a 1999 monograph entitled *Educating Noncommissioned Officers: A Chronological Study on the Development of Education Programs for U.S. Army Noncommissioned Officers*, author Daniel Elder cites almost ten years of HumRRO work—including the NCO projects—as resulting in much of the doctrine regarding NCO leadership selection and training.

HumRRO's influence was felt at more senior levels. Under **PROJECT HIGHLEAD**, Dr. Joseph Olmstead wrote *Leadership at Senior Levels of Command*, which was converted into DA Pamphlet 600-15. The volume was used as a text at the Command and General Staff College, several service schools, and the Canadian Staff College.

HumRRO Technical Report 66-20, The Effect of Programed Instruction Response Conditions on Acquisition and Retention, December 1966.


Technical Report 66-20

The Effect of Programed Instruction Response Conditions on Acquisition and Retention

by

Thomas J. McCrystal and T.O. Jacobs

HumRRO Division No. 4 (Infantry)

AD646-347

December 1966

Prepared for:

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HumRRO

The George Washington University
HUMAN RESOURCES RESEARCH OFFICE
operating under contract with
THE DEPARTMENT OF THE ARMY

Distribution of this document is unlimited.

THE 01Ks

DURING THE LATE 1960s AND EARLY 1970s, the Army assigned enlisted soldiers to work on HumRRO projects. The official Military Occupational Specialty (MOS) for this job was 01K, research specialist or testing specialist. The men chosen for this job were required to have civilian education in fields that were relevant to HumRRO's work, typically psychology. The 01Ks were assigned to Human Research Units co-located with HumRRO field units. As many as 50 soldiers received such assignments, which were especially valued during the Vietnam war because it meant no overseas duty. The work was similar to what a graduate assistant would do at a university plus military maintenance. This included literature reviews, test item writing, coordinating data collection, and so on.

Several 01Ks returned to HumRRO after completing their military service, and in two cases spent the better part of their careers with the organization. One of these, J. Patrick Ford, recalled how he was selected for the position.

> *In my case, the director of the HumRRO unit at Presidio of Monterey, visited the reception station and took one handful of personnel folders from the Fs and another from the Ws and scanned for soldiers with degrees in psychology or advanced degrees in related fields (I served with Ferrington, Winslow, Wuerthner, and Winningham). I had a graduate degree in public speaking, which the director thought would be a good match for work being done with compressed speech. Since most of us were draftees, there were seldom problems getting us the 01K classification. However, I had enlisted for 4 years, hoping to get language training, and the Army was reluctant to let me out of the commitment. After my transfer was rejected, the director considered it a personal challenge and interceded to get me reassigned. Because my training track would probably have resulted in an assignment as a field interrogator for two tours of Vietnam, I always thought that this action saved my life.*

Pat retired from HumRRO in 2005 with over 30 years of service to the company.

Gene Hoffman got to HumRRO a little more proactively, with just as positive an outcome.

> *With a draft number of 29 and draft notice in hand, I spent my first year in graduate school in I-O Psychology at the University of Maryland with a delayed entry over my head. With my induction looming in the summer of 1971, I learned from a fellow student (who was employed by the Federal Government) about HumRRO and the U.S. Army Human Research Unit (HRU) headquartered at Ft. Eustis, VA. He gave me the name and address of the Colonel in charge, and after a couple of glitches in the plan, I managed to get assigned to the Armor HRU at Ft. Knox. Life was tough! We had to be at work 37.5 hours a week, and polish our boots at least once every six months. As an I-O Psychology major, I did get to work on projects that fit my interests. For six or eight weeks, I wore a coat and tie to work and, disguised as a civilian, monitored the tank turret maintenance class. Hopefully, the project provided the Army with some useful suggestions to improve the efficiency of the instruction. As a low-level enlisted person, I did get a kick out of the sergeant instructor calling me "Sir." There was also some flexible time in which I recall having discussions with some of the HumRRO researchers, and by the time I returned to the University of Maryland, I had my master's thesis proposal fairly well nailed down. Of course, the biggest benefit of my tour of duty was through an invitation to a singles party via one of the young HumRRO employees: I met the girl that became my wife.*

Gene retired from HumRRO in 2015 after having been with the company for 34 years.

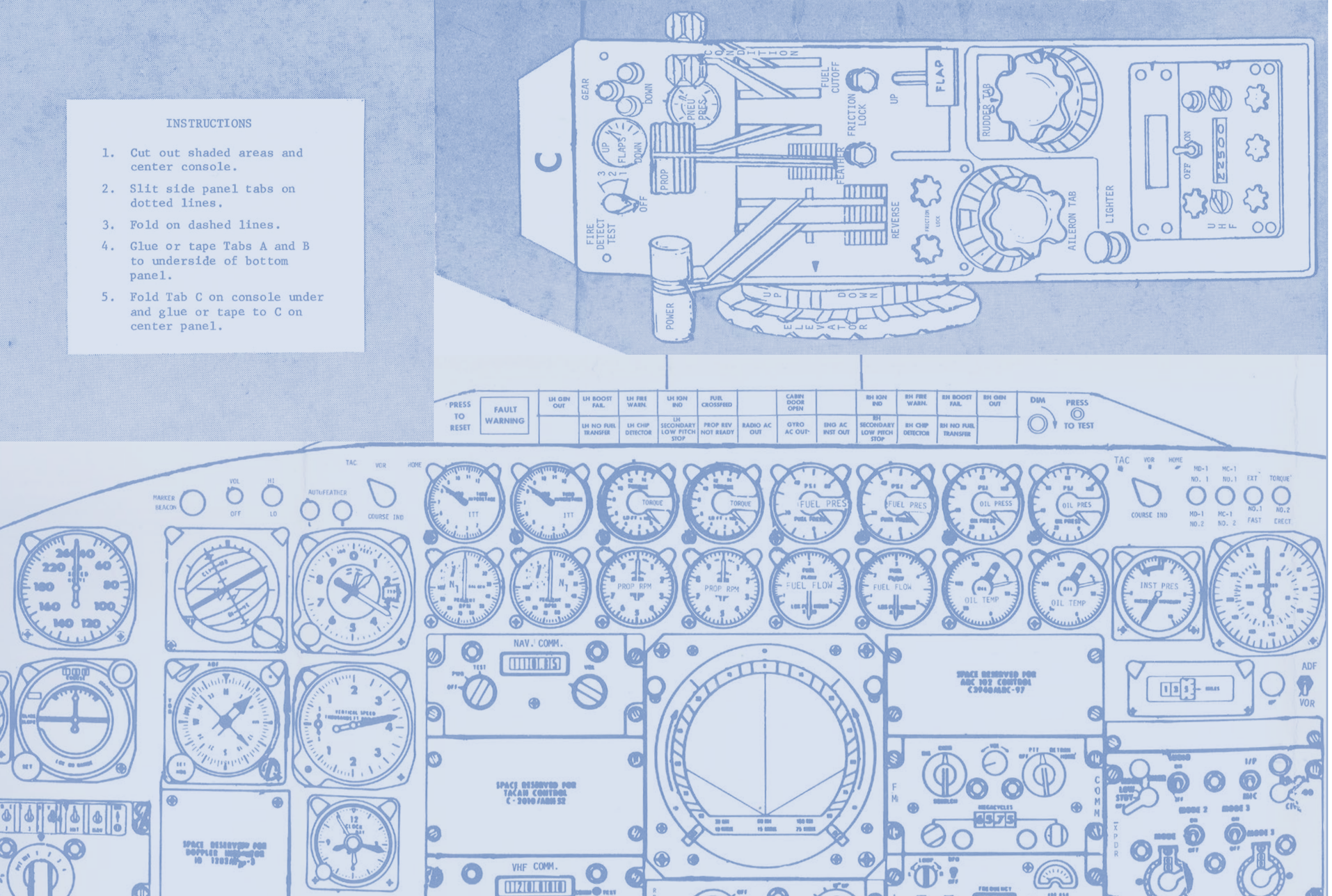


TRAINING

AS ONE OF HumRRO'S PRIMARY RESEARCH and development areas, training-related projects dominated the work load during this period. Some of these projects were process-oriented, focusing on the methods by which instructional programs should be developed. Others were more directly applied, often inspired by requests from schools or training divisions within the Army to examine and improve current practices. Several examples of each are described here.

Over the years, HumRRO personnel have been integrally involved in the evolution of the Instructional Systems Development (ISD) process, starting with its founder's early statement of its basic form. Working in applied settings and often under tight deadlines, researchers were required to identify the most effective and efficient means of applying the concepts of ISD. For example, in **PROJECT INGO**, the focus was on the setting of instructional objectives. Researchers began their endeavor by examining the literature on the processes involved in determining objectives. They then surveyed and interviewed personnel in eight Army schools whose responsibilities included this aspect of the ISD process. The investigators uncovered a variety of problems, including varying levels of specificity in terms of how target behaviors were described, a sometimes-tenuous relationship between the actions described in the objective and the desired behavior on the job, a failure to include conditions and standards, and the failure to distinguish between enabling and terminal objectives. These findings led the authors to analyze performance objectives on a variety of levels (e.g., type of performance unit, extent of action description, relevancy of student action to work situation). This analysis, in turn, led to a method of evaluating derivation methods depending on the type of objective desired.

During this period the Army showed an increasing interest in the use of training devices or simulators. As military technology and hardware grew increasingly complex, Army leaders recognized that using actual equipment for training was a very costly proposition. In **PROJECT RINGER** researchers sought to answer the question, "How much fidelity in training simulators is enough?" The task they chose to examine was the operation of the Section Control Indicator (SCI) console of the Nike Hercules guided missile system during missile preparation and firing. Twelve versions of training device were created, ranging from a simulator that worked exactly as did the SCI, to replicas with line drawings representing the various components. Between 15 and 20 men were trained using each of the 12 devices. Proficiency test results indicated no statistically significant differences between the groups. This outcome was supported by field tests in which military instructors used actual live equipment and the line drawing simulator to train soldiers during Advanced Individual Training. The results were similar. The researchers concluded that "when men are being trained to perform a fixed procedure, the requirements for functional fidelity in the training device are quite low."



The major emphasis in HumRRO aviation research efforts during the 1960s (and into the 1970s) was on the use of simulation and training devices in aviation training. A number of device research projects were carried out during this period. In **PROJECT ROTOR**, basic psychophysical models were developed for the requirements for visual, auditory, and motion cues in simulation devices, particularly those for the helicopter. In **PROJECT SYNTRAIN** researchers developed a very low-fidelity mock-up procedural training device. Constructed from plywood and instrument panel photographs at a cost of less than $50, the device proved to be just as effective in teaching cockpit procedures for the OV-1 Mohawk aircraft as a sophisticated computerized simulator that cost over $90,000. This research illustrated the fact that task fidelity, rather than *physical fidelity*, is a critical factor for effective training devices. In another study, HumRRO researchers developed a special training program for use with a low-cost commercially available fixed-wing instrument device that resulted in approximately a 40% reduction in the amount of flight time required for twin-engine transition and instrument training.

Army aviation grew at a rather astonishing rate during the 1960s. In the 1950s and early 1960s about 1,500 to 1,700 aviators graduated per year. This output increased remarkably during the Vietnam buildup, reaching a peak of some 7,699 graduates during 1969. Aviation training is an expensive commodity, and the need to reduce aircraft training accounts, at least in part, for the great emphasis on training device research. But, as the Army's requirement for aviators increased, there was also concern with flight attrition or "washout" rates which were generally running about 25-30%.

HumRRO constructed low-fidelity instrument panels for pilot training.

In **PROJECT ECHO** researchers studied the use of a small one-man captive helicopter mounted on a ground-effects machine platform. This device, known as the "Whirlymite," was used to give a small amount of training (3-7 hours) in hovering maneuvers prior to the beginning of primary helicopter training. The program involved special tasks that were quite unlike conventional helicopter training. Student pilots who received this experimental training showed significantly lower attrition (essentially zero washouts) and required less flight time to reach required proficiency in the aircraft, In addition, indices from the Whirlymite training tasks correlated better with advanced training performance than did the regular primary flight training grades, thus providing a valuable index of future performance.

In 1965, noting the growing complexity and cost of analog-based flight simulators (as well as their unreliability and high maintenance costs), a HumRRO aviation researcher prepared a highly significant paper entitled *Some Implications of Digital Computer Advances for Army Simulation Requirements*. This document outlined not only the potential that digital computation presented for significant increases in the fidelity of simulation of aircraft systems and flight performance parameters, but more importantly the potential that it presented for advanced training features such as automated training, objective performance recording, and automated feedback. As a result of this paper and HumRRO's established device research program, HumRRO was asked by the Army to prepare a statement of requirement for such a system. The resulting *Small Development Requirement (SDR) for a Synthetic Flight Training System* led to the development of Device 2B24, the Synthetic Flight Training System (SFTS). The SFTS was a four-cockpit instrument flight simulator for the Army's workhorse helicopter, the UH-1 Huey. It was the first digital simulator to be placed in operation in any of the military service's flight training programs, a truly revolutionary development. HumRRO worked with the Army Aviation Test Board to conduct the operational suitability test for the 2B24 device. This involved developing a special training program that included a number of approaches that differed from conventional training. These included:

(a) Maximizing time in the device,

(b) Individualized training with progress based on demonstrated performance,

(c) Functional context training,

(d) The instructor as training manager,

(e) Incentive rewards, and

(f) Crew and peer training.

The UH-1 instrument training program in use at that time involved 26 hours in an older device plus 60 hours in the UH-1 aircraft. The special test program called for 42.5 hours in the SFTS device but only required 6.5 hours in the UH-1 aircraft to reach proficiency, a highly significant reduction in required aircraft time. As a result, the Army procured additional copies of the 2B24 SFTS.

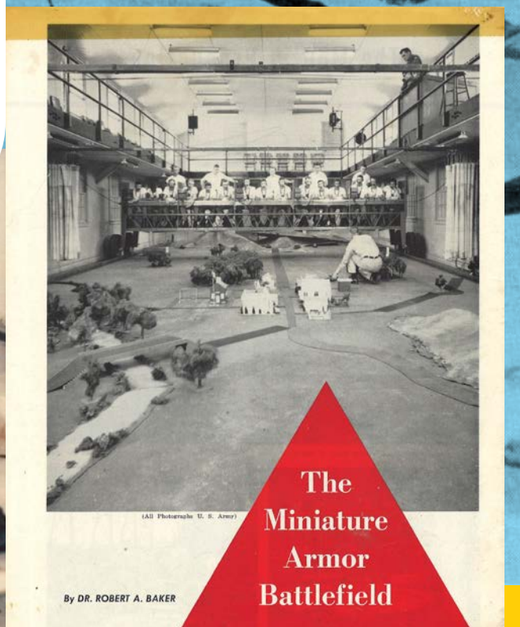
Providing tactical training opportunities is an ongoing problem faced by armor forces. HumRRO personnel conducted interviews to isolate the major difficulties experienced in this regard and found that a shortage of training areas and gunnery ranges limited the amount of training that the Army could provide. Researchers took a long view of this issue and found that innovative solutions had been used in the past. During WWI, for instance, large terrain boards were used to simulate tactical situations, with flour pellets thrown to represent artillery bursts. A realistic tactical map—called the Haskall map—was used during WWII to simulate battlefield operations.

With this history in mind, under **PROJECT UNIT** researchers set out to create the *Armor Combat Decisions Game*. The components of the game included a large terrain board with movable features such as trees, buildings, and roads. To conduct the exercise, they used fifteen plastic model tanks, along with control rods to move them. Each participant was given a headset that connected him aurally with those on his team. Members of the training staff performed as aggressors acting under the command of the instructor. They used a metronome to determine the speed of movement of the tanks, and other objects to simulate battlefield conditions (steel wool for smoke, balls of cotton for artillery fire, flashlights to show the direction of that fire).

A series of 10 increasingly difficult exercises was designed around critical tactical elements (e.g., command and control, fire control, use of terrain, coordination, and communication). Evaluation showed that armor personnel who trained on the Combat Decisions Game subsequently scored higher on a field-administered combat-readiness test. The game was later "upgraded" through the introduction of such elements as remote-control tanks. This high(er)-tech version was called the Miniature Armor Battlefield (MAB). The MAB received a great deal of attention, with articles about it appearing in such publications as *Army Times* and *ARMOR Magazine*. These articles generated interest from armor officers around the world, including U.S. troops in Europe, the Royal Canadian Armoured Corps, and National Guard Units across the country.







In many cases, HumRRO work was aimed at improving existing training programs by making them more relevant, effective, and efficient. These projects typically started out with an analysis of training needs. Researchers interviewed leaders, job incumbents, and other subject matter experts. On-the-job observations were often followed up with surveys, as is done today in job analytic studies. Once they had identified training priorities, they drew comparisons with existing training materials and practices. Such efforts frequently led to the conclusion that revisions could result in significant efficiency savings and effectiveness gains.

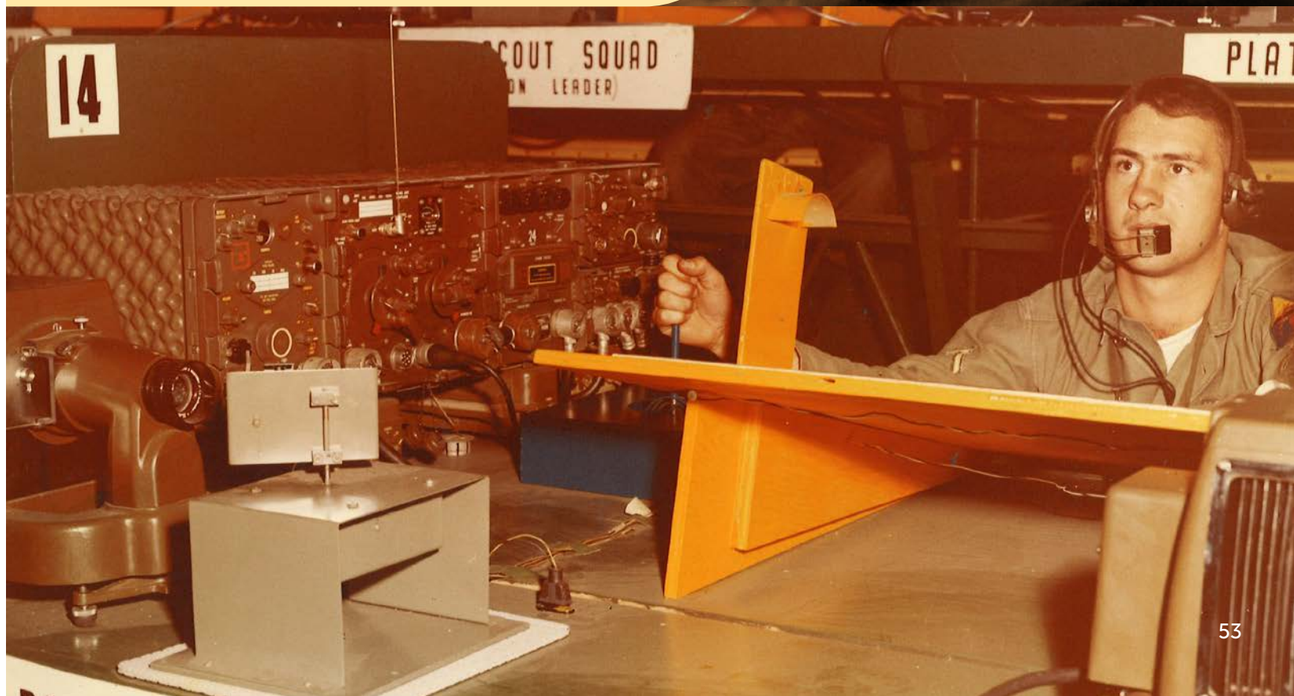
Several projects during this time period dealt with electronics maintenance training (**FORECAST**, **MAINTAIN**, **JOBTRAIN**, **LIMIT**, **REPAIR**, **MOSAIC**). From this body of work emerged an approach to training that, although common by today's standards, was innovative at the time. The overarching principle inherent to the approach was that training should be developed in a functional context and be guided primarily by the requirements of the job. This involved several interrelated methodologies that could be called "functional context training." For instance, when teaching troubleshooting techniques for electronic systems, a first step was to work with expert personnel and perform what would now be called a cognitive task analysis. As the experts analyzed the system to determine the source of the problem, they talked their way through their thought processes, which were noted by researchers. The training materials developed based on this information were organized around the system itself and by when and how it is used. This "outside-in" approach ensured that the information was organized as it would be used in the field. HumRRO research strongly emphasized organizing job aids in the same manner. A series of studies demonstrated that, through the use of this approach, training times could be cut by as much as one-half, with typically better outcomes in terms of performance. Through this work, a philosophy emerged that, "The U.S. Army needs are best met by organizing training to prepare a man to perform specific duties as dictated by the operational context in which equipment is used and by the nature of the equipment itself." This practical, hands-on approach came to characterize much of HumRRO's work, both during this period and in the years to come.

One of the skills that Army training personnel found difficult to convey was that of land navigation. Over time, evidence was collected that despite their best efforts, instructors were unable to impart the abilities required for soldiers to move from a starting point to a designated goal with accuracy. To address this problem, HumRRO researchers developed explicit performance requirements and a formal land navigation training course under work unit **PATROL**. The 12-hour program proved to be so successful that it was formally incorporated into Basic Combat Training (BCT). Subsequently, new doctrine developed that strongly emphasized greater mobility of troops and more dispersion of small units. This required the extension of the land navigation program to a more advanced level. HumRRO's Infantry Human Research Unit undertook this task under **PROJECT RIFLEMAN**.

After reviewing various manuals, researchers concluded that the navigational problems encountered by soldiers varied depending on the type of terrain in which they were operating and the mission being performed. They needed a "reference situation" that could be the basis for the training developed, and settled on a reconnaissance task for this purpose. This was based on numerous factors, including the need for "recon" units to alter their path due to encounters with the enemy or the presence of unexpected obstacles. Project staff then developed a system for describing and classifying terrain and route characteristics based on eight factors, such as amount and distribution of vegetation, degree of slope, and length of total route. By systematically varying these conditions, they were able to establish routes designated as easy, moderate, and difficult. The original BCT course trained soldiers to the "easy" level. The task now was to enable them to navigate the difficult routes.

To guide the development of the training program, researchers constructed routes at each of the three difficulty levels. Soldiers were then presented navigational tasks on the test courses and observers recorded their actions along the way. This provided diagnostic information used in determining the content of the advanced training. The HumRRO team then developed instruction on compass techniques, pacing measurement, detouring techniques, and map-reading skills. The resulting 10-hour course was evaluated by comparing the performance of soldiers who received training with the baseline results compiled as part of its development. Researchers noted significant improvements in both day and night navigation, enough to convince the Army of the value of incorporating the advanced training into the BCT program.





HumRRO NOTABLES

CHARLES W. "BILL" SMITH



CHARLES SMITH was born in Canandaigua, New York on July 25, 1921. Following graduation from high school, Smith joined the Army where he served for seven years, separating with the rank of Captain. His last active-duty assignment was as a rifle company commander. He directed supply, equipment, transportation, and securities activities along with training and directing the tactical employment of the unit. Smith was wounded in combat, leaving him with limited use of one arm. He received a medical discharge.

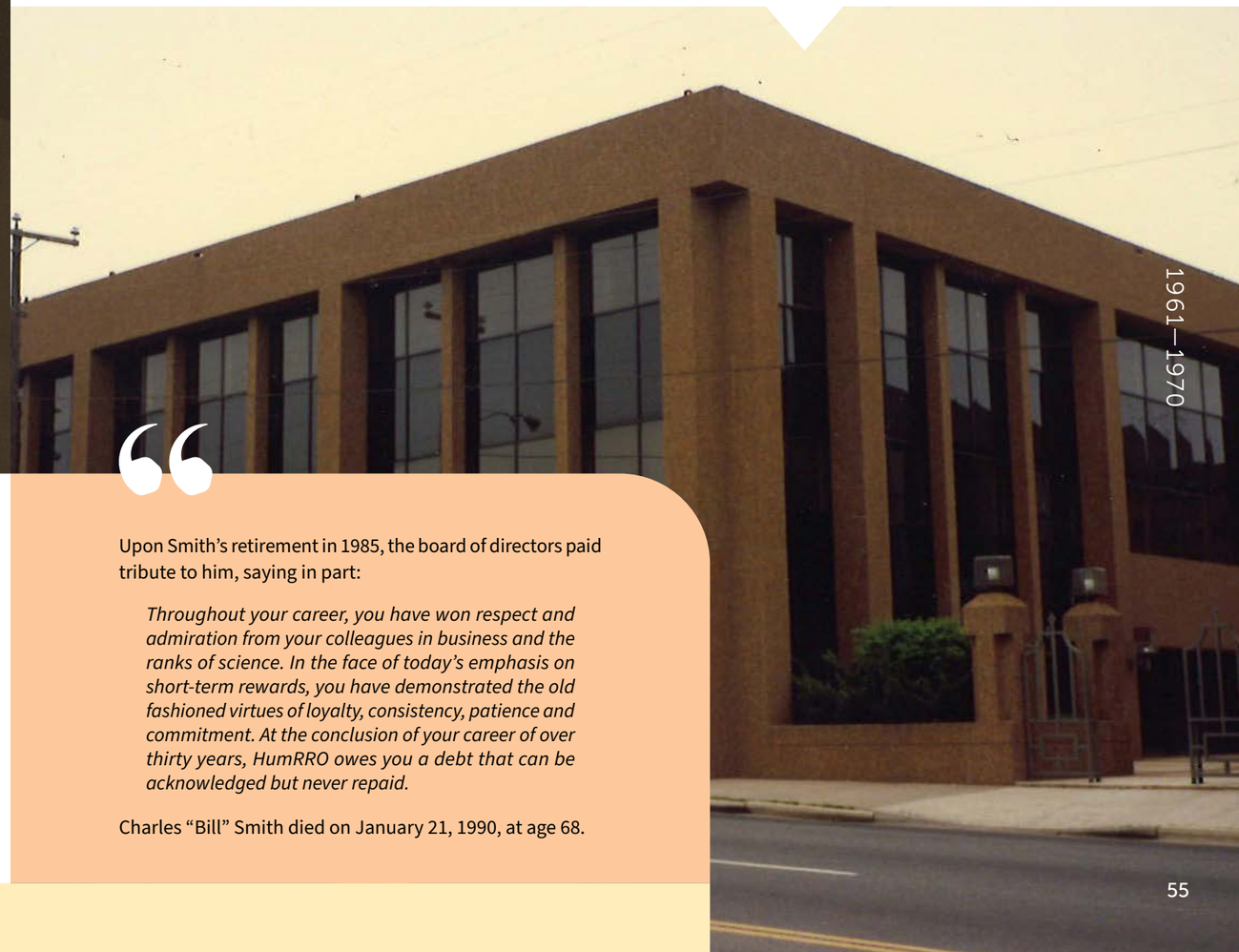
After the Army, Smith attended George Washington University where he earned a Bachelor of Arts in business administration. He went on to law school at GWU, obtaining his L.L.B. in 1953. Upon graduation, he accepted a position with the Acacia Mutual Life Insurance Company. During the summer of 1954, Smith applied to the newly created HumRRO for the position of Assistant Business Manager. He accepted the position in a letter to Harold Bright, Ph.D., HumRRO's acting associate director. Smith wrote, "At this time I would like to express my thanks and appreciation for the gracious manner in which I have been oriented and introduced to HumRRO. I am confident that my tenure will be an enjoyable one."

In 1956, Smith accepted the position of Executive Assistant in the Directors Office. One year later he was appointed Business Manager, a position he was to hold in one form or another for the next 27 years. Over time, Smith's realm of responsibility grew. In 1963, he was given general supervisory duties for the firm's administrative functions.

When HumRRO incorporated in 1969, Smith was named Treasurer of the organization. In 1975, he was named Vice President, and in 1978 he was elected to serve on the Board of Trustees.

In March of 1979, then-president William McClelland entered the hospital for heart surgery. Following his recommendation, the Board of Trustees appointed Smith acting president. When McClelland died as a result of complications from his operation, Smith continued to serve as HumRRO's president until a successor was found in the fall of that year.

Perhaps Smith's most visible contribution to HumRRO came in the form of the 1100 South Washington building. He was responsible for protecting HumRRO's interests throughout the lengthy negotiations that led to building occupancy. Moreover, it was Smith who attended to the myriad of details that accompany a brand-new space, including interior architecture, phone systems, and furniture.



Upon Smith's retirement in 1985, the board of directors paid tribute to him, saying in part:

> *Throughout your career, you have won respect and admiration from your colleagues in business and the ranks of science. In the face of today's emphasis on short-term rewards, you have demonstrated the old fashioned virtues of loyalty, consistency, patience and commitment. At the conclusion of your career of over thirty years, HumRRO owes you a debt that can be acknowledged but never repaid.*

Charles "Bill" Smith died on January 21, 1990, at age 68.



CHAPTER 3. HumRRO Through the Decades





1971—1980



STRUGGLING TO FIND A NICHE

THE DECADE OF THE SEVENTIES was a critical and challenging time for the now independent HumRRO. Although the work programs for the Army continued through 1975, they were reduced in both scope and funding. During 1972, some 68 percent of HumRRO revenue came from the Department of the Army. The corresponding dollar amount decreased by one-third in 1974, and again in 1975. This resulted in part from the decision to end the exclusive relationship HumRRO had with the Army. But another decision in 1972 furthered the organization's independence.

In the early 1960s, the National Science Foundation classified HumRRO as a Federal Contract Research Center (FCRC). This was done independently; that is to say, HumRRO neither requested nor was consulted about this move. As of 1971, there were 12 Department of Defense (DoD) FCRCs, including the Institute for Defense Analysis, the MITRE Corporation, and the RAND Corporation. Among the defining characteristics of these organizations in terms of their FCRC status was that they were involved in research and development, received 70% or more of their funding from the Federal Government (usually one agency), and had an average budget of at least $500,000. These contracts were generally non-competitive, sole source, and of lengthy duration. By accepting this status, the organizations were expected to not compete for work except with one another and to accept work only of the type deemed appropriate by their primary sponsors. In exchange, those sponsors were to provide steady, relevant work along with the resources required to complete it.

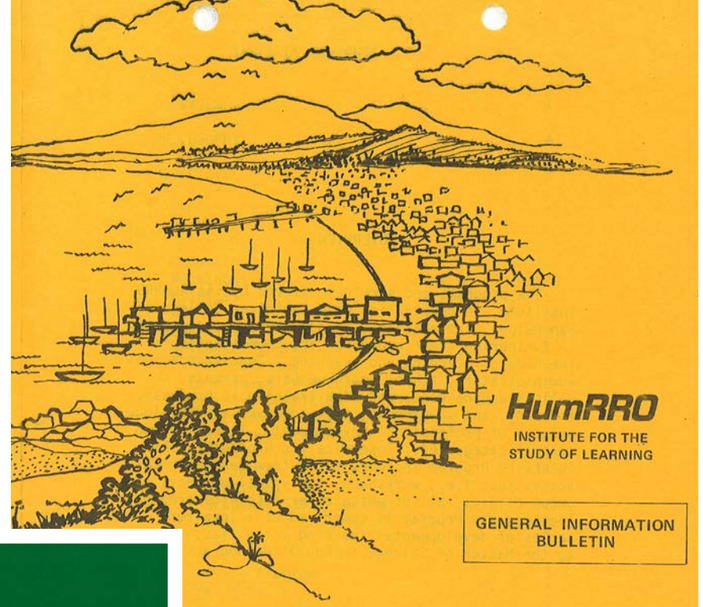
Meredith Crawford briefs staff on cutbacks being implemented in the face of financial constraints.

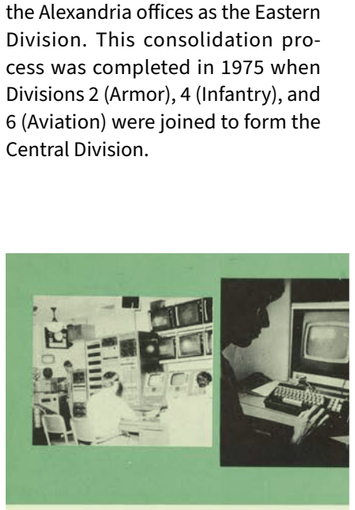
As far back as 1963, Congress began to express concerns about the operation of FCRCs. The General Accounting Office (GAO) conducted a number of inquiries and inspections of the contracting organizations, including HumRRO. Although no improprieties were uncovered through these investigations, the concerns led Congress to place funding limits on FCRCs, either individually or as a group. The impact of these ceilings became particularly apparent to HumRRO following the end of their exclusive relationship with the Army. Projects for which the organization was fully able to compete were out of range due to the funding caps. Other changes exacerbated this situation, including an opening up of the Army contracting process that made the awarding of contracts on a sole-source basis more difficult. These forces led HumRRO management to consider seeking an end to their FCRC status.

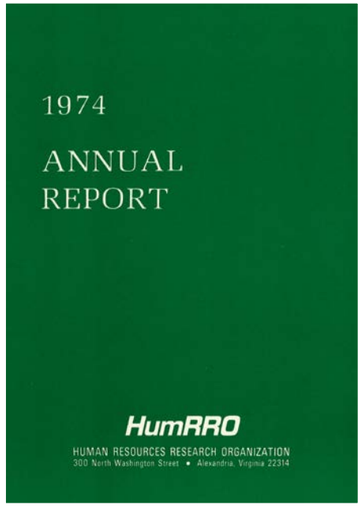
After much debate and discussion, a formal request was made to the Army on December 8, 1971 that HumRRO be "delisted" as an FCRC. The request was granted and took effect as of July 1, 1972. With the ending of the final sole-source contract in 1975, HumRRO was now a fully independent organization with no sustaining sponsors. The challenges were just beginning.

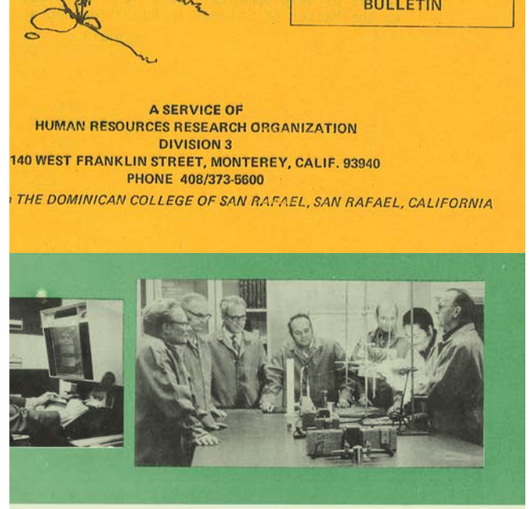
Among the changes wrought by these developments was the need to move HumRRO personnel off of Army bases at the various field units. The organization also needed to devote attention to marketing itself to new clients outside the Department of the Army who were, in many if not most cases, unaware of HumRRO's work and reputation. Towards this end, HumRRO hired a public relations firm to guide management. Another blow came in 1974. Three years prior, HumRRO formed a Manpower Research Group to conduct studies and analyses for DoD on the procurement, utilization, performance, retention, and separation of military personnel. Subsequently, discussions were held with the Office of the Assistant Secretary of Defense for Manpower and Reserve Affairs to establish within HumRRO a manpower research and utilization center. Although the proposal was ultimately rejected, the concept was not and DoD decided to move its military manpower research operations in-house. A majority of those HumRRO employees who had been involved in these efforts (chiefly examining existing databases to support policy and program decisions) became members of the newly formed Manpower and Research Data Analysis Center (MARDAC), now known as the Defense Manpower Data Center.

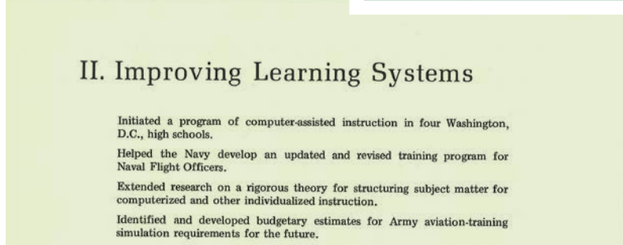
Financial pressures began to take a toll. One response involved combining organizational units to increase efficiencies. In 1973, Divisions 3 (Recruit Training) and 5 (Air Defense) were merged and became the Western Division, located on the Presidio of Monterey, California. The following year, Divisions 1 (System Operations) and 7 (Language and Area Training) were combined in the Alexandria offices as the Eastern Division. This consolidation process was completed in 1975 when Divisions 2 (Armor), 4 (Infantry), and 6 (Aviation) were joined to form the Central Division.

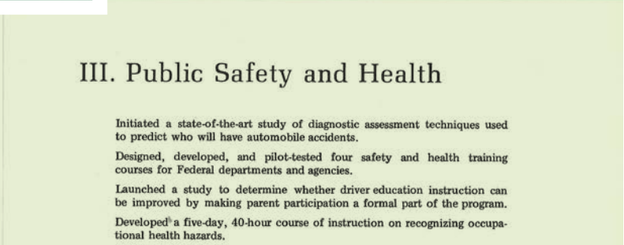












A brochure from the HumRRO Institute for the Study of Learning.

With the completion of the final sustaining Army contract in 1975, HumRRO experienced a significant drop in revenues of over a million dollars. Numerous measures were taken in response, including the scaling back of some benefits and the imposition of forced leave. Still, many employees continued to work, writing proposals on their own time in an effort to turn fortunes around. In 1975, HumRRO netted a total of $125,000.

Still, there were signs of hope. The 1974 Annual Report shows an emerging diversity in the client base. HumRRO was now doing work for multiple military services (Army, Air Force, Navy), as well as the Departments of Health, Education, and Welfare; Labor; Transportation; and the United States Postal Service. Contracts were in place with a variety of state and local governments, including the Alabama Department of Mental Health, the City of Louisville, KY, the Illinois Law Enforcement Commission, and the District of Columbia Public Schools. In his report to the Board of Trustees, president Crawford reported that, "… our transition from the 'captive' state as a FCRC meant that we would have to expend a great deal more effort in securing new business. I believe we have learned and continue to learn a great deal about how to live in a competitive world."

One effort undertaken by HumRRO's Western Division was called the HumRRO Institute for the Study of Learning. The goal was to translate the considerable knowledge and experience that had been built up over the organization's history into a series of developmental workshops for teachers, administrators, and others concerned with the quality of education being delivered to America's youth. Such workshops would address a variety of topics, including inquiry-based instruction, peer instruction, teaching reading in a functional context, and educational environmental design. Participants would also be offered the opportunity to design developmental projects that would address their own personal needs, and to take part in clinics that were structured as team building exercises for professionals

from a single setting. One of the keys to the success of the Institute was that it be allied with a degree-granting institution so that those who took part could earn credits. HumRRO approached a variety of partners, and established a potential working relationship with the Dominican College of San Rafael, in California. Several workshops were carried out as the details of the relationship were discussed. Although these were successful by all accounts, difficulties were encountered when the college was told that its relationship with this endeavor could have a negative impact on accreditation. In the final analysis, the two organizations could not overcome this roadblock, and the Institute was closed.

On March 31, 1976, after 25 years at the helm, Meredith Crawford retired as president. He was succeeded by William A. McClelland, who was elected unanimously by the Board of Directors. McClelland had been with HumRRO almost from the start, joining the organization in 1955 as Director of the Training Methods Division. Therefore, he was able to provide a much-needed degree of continuity during a period of some tumult.

In his report to the Board in February of 1976, Dr. Wally Prophet, director of the Central Division, painted a gloomy picture. “As predicted in our last report to the Board, the first half of FY 76 has been extremely trying for the Central Division. The DoD budget hang-up and a variety of other factors have resulted in a delay or elimination of a number of expected contracts ... Failure to realize these expectations has led to severe hardship for many of our personnel. Many have had to use their accumulated leave to maintain income, and some have been placed in leave-without-pay status. There has been considerable human toll in all this. We have lost permanently about 10% of the personnel with whom we started the year and may lose others yet.”

With this background in mind, HumRRO leadership decided to deactivate the Central Division as of July 1, 1976.





Meredith Crawford stepped down as HumRRO president on March 31, 1976 after 25 years at the helm of the organization.

Dr. Prophet wrote to his staff:

> *I have gotten to know each of you over these past 18 months, and I would like to express to you my sincere thanks and appreciation for your efforts and your support. There is probably little to be gained by looking back at what we could have done differently, though I am sure we are all blessed with very astute hindsight, but one thing we do know; the Central Division did not fail because of inadequate effort on your part, either in quality or in quantity. I know you have all performed admirably and have all sacrificed greatly during this trying period, and I only wish I could repay you in some way.*

In December of 1978, HumRRO President William McClelland wrote a memo to Meredith Crawford, president of the board of trustees, in which he indicated that, due to health problems he reluctantly decided to step down from the position. In March of 1979, McClelland entered the hospital for heart surgery. He wrote to the Board, “While I had hoped to delay the matter longer, recent tests indicate I had better get repaired while I am in reasonably good health. I expect to be out of action effectively for a month, and hopefully back at work, at least part time, late in April.” On March 16, he died in the hospital of complications arising from the surgery. Bill Smith, HumRRO’s vice president and treasurer, who was assigned temporary duties as president in McClelland’s absence, remained in the role until a successor could be found. A search committee of board members was established and, after several months of searching and some contentious discussions among the board, James Singleton was named president of HumRRO, effective August 1, 1979. The organization had its first leader from the “outside.”

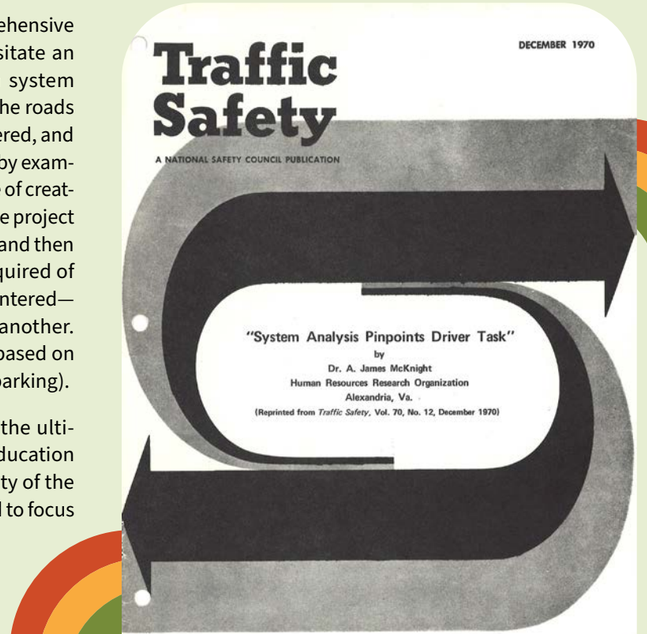
At the start of the decade, HumRRO staff included 260 people. The additional moves toward independence and their attending impact reduced that number by more than half (106) by September 30, 1980.

FACTORS AFFECTING PERFORMANCE

DURING THE 1970s, HumRRO researchers conducted a series of projects for the Department of Transportation. Focused on the skills and abilities required to drive an automobile, this research was impelled by the Highway Safety Act of 1966, which assigned to the National Highway Safety Bureau (NHSB) the responsibility for issuing guidelines to assist states in improving the quality of driver education programs. After several studies were conducted, NHSB officials determined that the work was being hampered by a lack of standards that could be said to define what constitutes "good" driving. Safety officials concluded that they needed an analysis of driver tasks that could then serve as the performance objectives to use in determining the knowledge, skills, and abilities required for proficient driving. NHSB hired HumRRO to conduct this analysis.

Researchers quickly determined that a comprehensive identification of driver behaviors would necessitate an analysis of the entire highway transportation system including the driver, the vehicle being operated, the roads over which it was being driven, the traffic encountered, and other environmental conditions. This effort began by examining those aspects of the system that were capable of creating situations to which the driver must respond. The project identified more than 1,000 system characteristics, and then attempted to pinpoint the specific behaviors required of drivers when each system characteristic is encountered—both individually and in combination with one another. Related behaviors were then grouped into tasks based on the ultimate goal of the behaviors (e.g., passing, parking).

Given the number of actions identified and the ultimate goal of the research was to inform driver education efforts, the team decided to evaluate the criticality of the behaviors. This would allow individuals in the field to focus on those determined to be most germane to proficient driving. Project investigators identified a group of authorities in the field and asked each one to provide criticality ratings for a subset of the behaviors. Analyses of these data uncovered a high degree of inter-rater agreement. The researchers then used the criticality ratings to derive a series of 74 performance objectives that were judged by experts to encompass the minimum requirements for safe and effective entry into the highway transportation system. Finally, those objectives became the basis for the development of guides for teacher preparation in driver education. The Government Printing Office put the guides on sale, and some weeks later reported that they were selling well. All of the materials developed as part of this project received great attention within the field of driver education, where they were hailed as much-needed additions to the literature.







Of course, much of HumRRO's work in the human factors arena during the 1970s was still performed for the Department of Defense and the U.S. Army. A center for such activity during this period was the Ft. Hood field unit. Under contract to the U.S. Army Research Institute for the Behavioral and Social Sciences, researchers at this site investigated a wide range of human factors issues. These included:

- The psychological and physiological effects on tank crews that result from being "buttoned up"
- The fatigue effects that result from wearing night vision goggles
- Factors affecting long-range target identification
- Methods for improving helicopter aircrew performance
- Improvement of training realism for tactical units
- The design of soldiers' manuals
- The impact on Army personnel assignment of adopting physical fitness standards
- The psychological and physiological factors to be considered in constructing field fortifications

Left: The work done under project DOT was summarized in an article in a publication by the National Safety Council.

Researchers at Fort Benning were also busy during this period. One project of significant duration, **PROJECT IDENTIFY**, concerned the ability of humans to detect booby traps and land mines. Interest in this field was spurred on by findings from Vietnam that as many as 33% of the casualties experienced during a given period resulted from these devices. Further, prior research indicated that there were strong individual differences in the ability to detect mines; soldiers were either good at this task or they were not. Attempts to isolate individual differences in this regard yielded mixed results, and HumRRO researchers determined that a systematic approach was needed. They began by developing a job model that included a psychological analysis of the detection process and a review of the literature on visual discrimination. This led to the identification of 24 individual skills relevant to mine detection. Job performance predictor tests were then developed and validated. These included two written tests (activities participation, dogmatism), a visual-acuity measure, and field tests of speed of movement and effort expended during a (non-mine) search task. Other predictors found to be related to performance were years of education and degree received (none, GED, high school diploma). This further led to recommendations regarding training for mine detection, including stressing the importance of slow, careful searches, instruction on basic cues to look for, and devoting the maximum time possible to practical fieldwork.

MILITARY LEADERSHIP

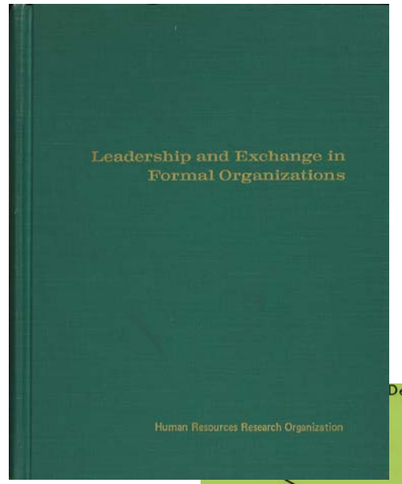
DURING THIS PERIOD, HumRRO researchers continued to investigate a wide variety of issues related to leadership assessment and training. In 1973, HumRRO was called in to assist in the establishment of an assessment center pilot program at Fort Benning, Georgia, named **PROJECT ASSESS**. Assessment centers typically involve a series of staged activities that closely parallel those functions a candidate would be expected to perform on the job. Situations are presented and evaluators rate individuals on how they respond. These ratings are then used to screen persons who would be most likely to meet training and on-the-job requirements. At Fort Benning, the interest was in three groups: student NCOs entering the NCO educational system, students entering the Infantry Basic Course, and student officers entering the Infantry Advanced Officer Candidate Course.

As a first step, researchers prepared a set of leadership dimensions on which candidates would be evaluated. Fourteen such dimensions were identified, eleven of which were deemed suitable for assessment in this format. Simulations were then designed specifically to elicit behaviors relevant to the dimensions. Two of these were combat-based scenarios, while the third—intended for junior officers—was in a non-combat context. In addition to developing the situations, the researchers created procedures for administering and rating performance in the assessment center. Because of the importance of obtaining reliable and valid ratings, they paid particular attention to developing materials for training those responsible for running the exercises and evaluating the candidates who took part.

The final simulations required 4–5 hours to administer. They were designed to present a variety of problems and to function so that environmental pressures continued to build over the time period. The preestablished criteria for assessment required raters to provide anywhere from 111 to 124 distinct scores over the course of the scenarios. After pilot-testing the materials, HumRRO researchers concluded that it was indeed feasible to create environments characteristic of complex hierarchical organizations. They reiterated the importance of standard assessment practices, such as uniform conditions for all assessees and strict adherence to protocols for administration.

One function that HumRRO personnel provide on a continuing basis is to serve as a bridge between various arenas in which work is being done on similar or related subject areas. For instance, by keeping up to date with advances in basic research conducted in academia, researchers are able to call on these findings when they may pertain to applied settings. Two examples of this were projects **SKIM** and **GAMES**. In the former, HumRRO was asked to address a need for supervisory and management training for Army leaders. This was based on concerns that typical academic training in these disciplines was so far removed from the day-to-day world of military leaders that transfer of the principles and practices learned was difficult. Therefore, leaders were often forced to learn to supervise by trial and error. HumRRO personnel developed an in-unit leadership/management training program based on an experiential training methodology. The three "disciplines" of interest were individual and group problem solving, management by objectives, and performance management. This training was delivered to three battalion-sized combat units at Fort Bliss, Texas. HumRRO's research team also provided follow-up consultation, along with evaluation efforts and an assessment of the potential for distributing the training on a larger scale. In **PROJECT GAME**, researchers sought to capitalize on the work being done in private industry in which games were used for both training and evaluation purposes. In this case, they focused on the problem-analysis, decision-making, and interpersonal skills of junior company-grade Army officers. After examining the skill requirements in these areas, researchers sampled and reviewed management games and simulation exercises that were in use at that time for jobs similar to those of these junior officers. Through this process, they were able to construct a method for evaluating independently developed products of this type for their applicability and potential usefulness. Finally, they recommended a framework for constructing simulation games to meet Army requirements.

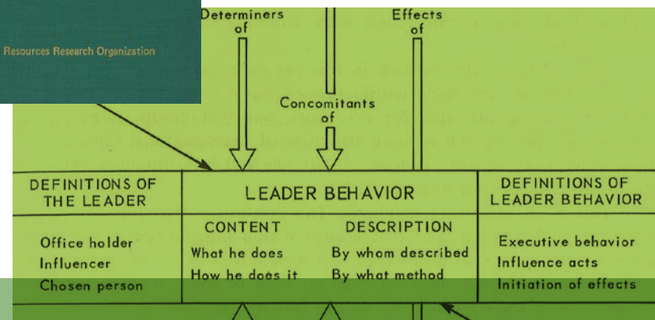
Perhaps the most visible HumRRO product pertaining to leadership in this period was the volume, *Leadership and Exchange in Formal Organizations* by HumRRO Division Director Dr. T. O. Jacobs. The purpose of this volume was to "review and reinterpret the existing literature on leadership, power, and influence processes in general, in order to arrive at a somewhat more general approach to understanding them." The author cited three influences that led to this synthesis: social exchange theory, a 1969 review of the leadership literature by Hollander and Julian that drew the link between this arena and social exchange, and a growing awareness within the Navy (which sponsored the work) for the need to integrate the various theories and findings in the leadership domain. Among other influences, Jacobs cited the work of Dr. Carl J. Lange, a long-time senior HumRRO manager.



Leadership and Exchange in Formal Organizations included an historical perspective on the study of leadership, and a summary of then-contemporary positions as espoused by various centers of study (e.g., Ohio State University, University of Michigan). Jacobs then presented his transactional approach with its emphasis on the concepts of social exchange, discussed in terms of motivation in formal organizations and small group processes. He described an organizational context for leadership and delineated the relationship between leader behavior and organizational effectiveness. In his own overview of his approach, Jacobs stated:

> *It is true of any science that knowledge is never complete. This is certainly true of the study of leadership. It is also true of a science that knowledge should grow, through systematic re-examinations of the body of findings, to seek among other things more parsimonious explanations for known relationships. While a social exchange approach to understanding of the processes involved in "superordinate-ship" may not be the ultimate solution, it appears to contribute to more ultimate purposes by offering a mechanism that seems to deal equally effectively, and in the same terms, with influence processes in both formal organizations and informal groups.*

Leadership and Exchange in Formal Organizations was without doubt one of HumRRO's top-selling publications. It was adopted for use as a textbook in management classes by the U.S. Army and a variety of major universities (University of Maryland, University of North Carolina, University of Kentucky). Several reviewers gave it high praise, including one who deemed the book, "a major contribution to the sociology of corporations."



PERSONNEL RESEARCH

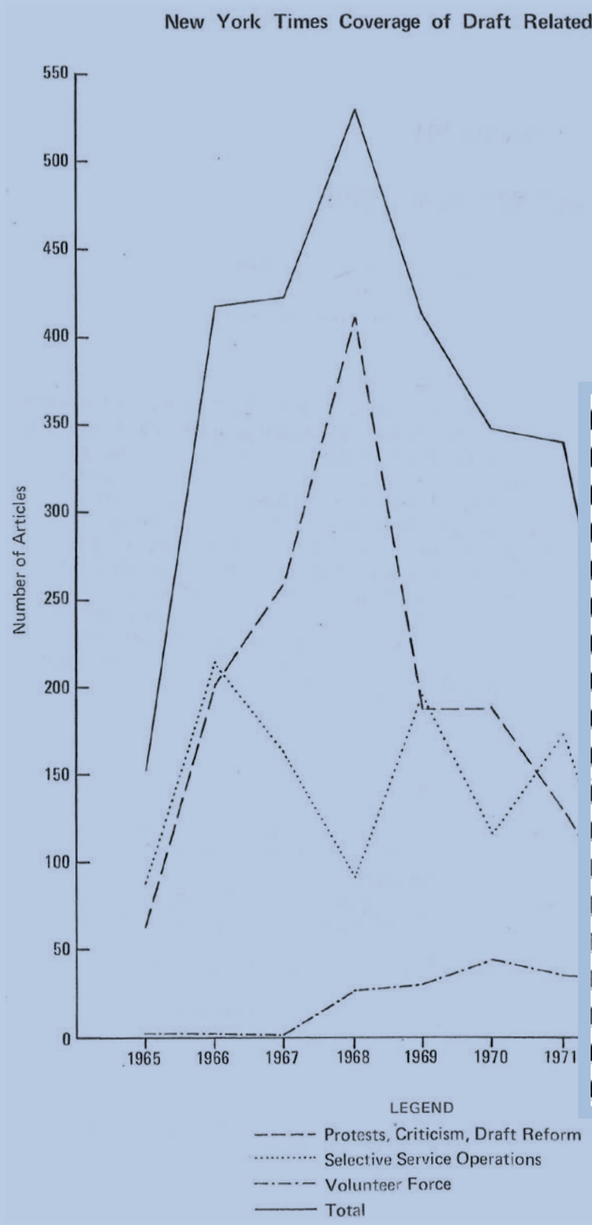
JUNE 30, 1973 marked the end of the military draft in the United States and the inception of the All Volunteer Force (AVF). Many leaders in the Defense Department greeted this change with some trepidation, fearing the degradation of the quality of soldiers, sailors, airmen, and Marines who would enter the services in a strictly volunteer environment. Many civilian activists were also concerned that the role of defending America's national interests would largely be left to those who did not have the resources, either personal or financial, to pursue other paths to the future. As a result of such concerns, DoD initiated a variety of studies aimed at assessing the impact of this new system, both on the military services and on those who entered service in this new age. HumRRO played a significant role in this work, and continues to do so today.

PROJECT DRAMA was initiated to conduct studies and analyses on accession patterns, medical standards, and enlistment incentives. Among the many studies conducted as part of this effort were:

- An examination of the impact of the combat arms bonus
- A study of the success of efforts to procure military medical personnel
- An analysis of the impact of education benefits as recruitment incentives
- An examination of the characteristics of senior-level civilian executives within DoD, and an analysis of the implications for executive development
- An analysis of participation rates in the Veteran's Educational Assistance Program (VEAP)
- An evaluation of DoD's high school testing program, which provides a vocational counseling tool to high schools in return for recruiter access
- An evaluation of the Federal Voting Assistance Program, which was created to provide assistance to military members and federal employees overseas in exercising their franchise through absentee balloting

One of the most significant documents to come out of project DRAMA was a history of the transition from the draft to the AVF. *Ending the Draft—The Story of the All Volunteer Force*, was written by HumRRO employees Gus C. Lee and Geoffrey Y. Parker. Prior to coming to HumRRO, Lee was associated with the Office of the Secretary of Defense. He served as the Director of Procurement Policy and Staff Director of Project Volunteer. Through this insider's perspective, Lee was able to trace the events that led to the decision to end the draft, as well as the planning required to make the transition to the AVF. The authors explained that the volume was "… an overview rather than a complete account of everything that happened. There is no claim to omniscience. Some of the opinions of the authors differ from those of others who may be equally well informed. An attempt has been made, however, to present more than one side of an argument. Both authors favor the volunteer force policy but have tried to present a factual, balanced account." One hundred copies of this report were delivered to, and circulated within, DoD.

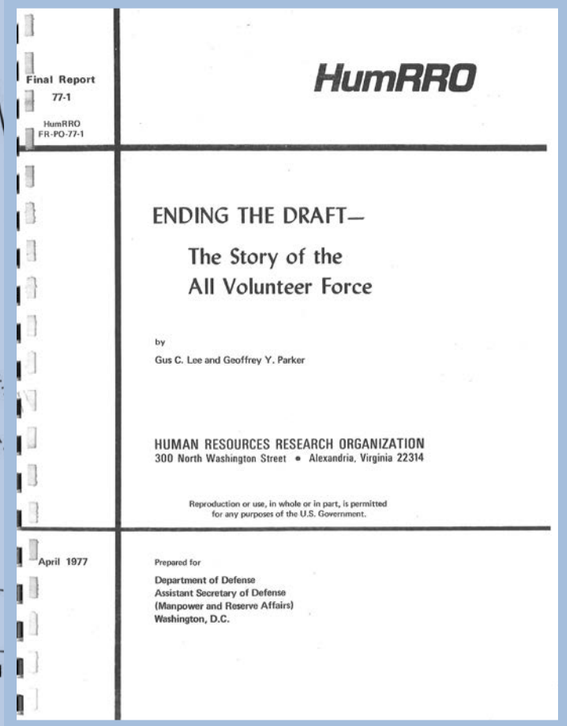
Right page: Gus Lee and Geoffrey Parker's recounting of the path to the All-Volunteer Force was, to say the least, comprehensive, coming in at some 535 pages.



Utilization of Military Women

The study of the utilization of military women was also one of t more timely and successful studies produced by the task force. The t force asked the Army, Navy, and Air Force to analyze plans to double the number of military women from the end of FY1973 to FY1977 and the Marines to analyze plans to increase 40 percent. Shortly after the s began, the Equal Rights Amendment was passed by the Congress in March 1972, focusing the nation's attention on equal rights for women. Als Deputy Assistant Secretary of Defense Daoust pressed the Services vig ously to improve the utilization of women.

In response to the impetus of the Equal Rights Amendment, the "c tingency plans" under study by the Services on the utilization of wom were announced as action plans. The Air Force announced plans to tri the number of military women by FY1977; the Navy announced plans to double the number of women by FY1977; the Army announced plans to dou recruiting lishment of crease.


Final Report 77-1
HumRRO FR-PO-77-1

HumRRO

ENDING THE DRAFT—
The Story of the All Volunteer Force

by
Gus C. Lee and Geoffrey Y. Parker

HUMAN RESOURCES RESEARCH ORGANIZATION
300 North Washington Street • Alexandria, Virginia 22314

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April 1977

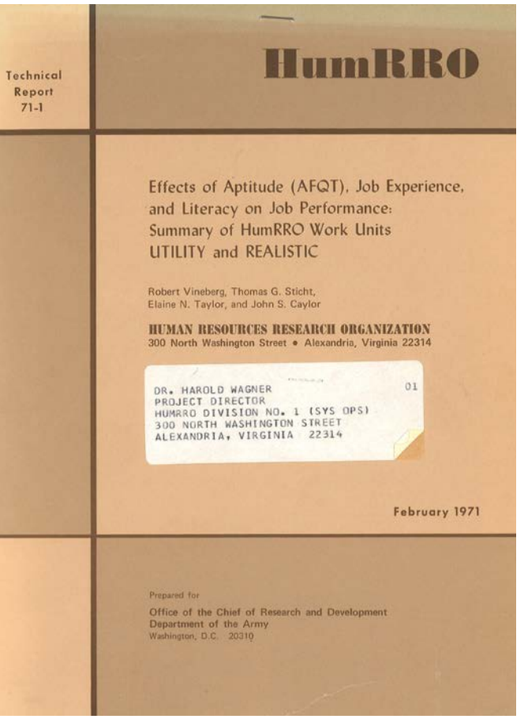
Prepared for
Department of Defense
Assistant Secretary of Defense
(Manpower and Reserve Affairs)
Washington, D.C.

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In addition to the increased strengths of military women, the ta force study made recommendations for broadening the assignment oppor- tunities for military women and for improving selection policies. Af

HumRRO Technical Report 71-1, Effects of Aptitude (AFQT), Job Experience, and Literacy on Job Performance: Summary of HumRRO Work Units UTILITY and REALISTIC, February 1971.



Aptitude and Performance

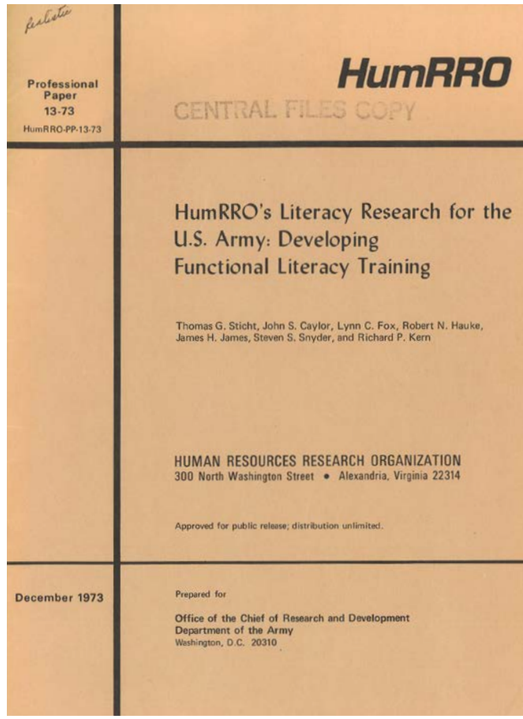
Right from the organization's beginnings in the early 1950s, HumRRO researchers were involved in examining the relationship between aptitude and learning and aptitude and performance. In 1955, the effectiveness of a special Army remedial education program for "marginal men" was examined. Shortly thereafter, studies followed on the kinds of training techniques most effective with lower aptitude personnel. In 1964, HumRRO participated in the preparation of *Marginal Men in Military Service: A Review.* This publication brought together most of what was known about the topic at that time. In 1966, HumRRO researchers completed a study of the performance of Category IV men (those scoring between the 10th and 30th percentiles on the Armed Forces Qualification Test) and non-Category IV men in Army basic training. In the summer of 1966, the Department of Defense asked for proposals to study the use of lower-aptitude men in the military in support of Project 100,000. This effort, launched by then-Secretary of Defense Robert McNamara, sought to bring into service 100,000 men a year who would normally be turned away for failing to meet aptitude standards. The rationale for the program was that military service would provide a "leg up" for these largely disadvantaged men. In association with these efforts, HumRRO initiated work units **UTILITY**, **REALISTIC**, and **READNEED** which sought to investigate the roles that low-aptitude men could perform in the military and the importance of reading, listening, and arithmetic skills in various military jobs. Over the years, many informative and provocative studies were carried out under these and related projects.

Under work unit **UTILITY**, the performance of job incumbents in four major military occupational specialties was studied, including Armor Crewman, Vehicle Repairmen, Supply Specialist, and Cook. Category IV men were matched with those of higher aptitude with regard to tenure on the job. Assessments were made through especially constructed, hands-on job sample tests, paper-and-pencil job knowledge tests, and supervisor ratings. These data were supplemented with information from personnel records and a variety of cognitive aptitude measures.

Under work unit **REALISTIC**, researchers assessed the reading, listening, and mathematical demands of three large-volume military occupational specialties (MOS). Research efforts piggybacked on those of UTILITY, by examining the comprehension skills of the same group of low- and higher-aptitude men in relation to the same job performance measures. They also collected data on each man's job-related reading, listening, and arithmetic behaviors. Among the major findings from these efforts were the following:

- AFQT scores were found to be related to job performance, although there was considerable overlap between lower- and higher-aptitude men.
- Supervisor ratings bore little relationship to performance as measured by the other indices.
- Time on the job clearly lessens the impact of aptitude on job-sample performance; after 30 months approximately 90% of the soldiers performed at the upper levels of the performance distribution.
- The higher a man's reading level, the more likely he was to rely on written materials in job performance. Those with less reading ability depended more heavily on asking others for help.
- Reading, listening, and arithmetic skill were all found to be related to job proficiency as measured by hands-on and written tests.

These data provided several valuable insights into the use of lower-aptitude men in the Army. First, it was apparent from this and other studies that Category IV men do not perform as well as those with greater aptitude. However, the differences detected appear to fade as a function of time on-the-job—at least in the MOS included in these studies. Researchers recommended that screening for reenlistment



HumRRO Professional Paper 13-73, HumRRO's Literacy Research for the U.S. Army: Developing Functional Literacy Training, December 1973.

could be enhanced by the use of the job knowledge tests. Finally, the results emphasized the importance of listening as a learning tool among those whose reading comprehension was limited. This implies that the ability to comprehend by listening may be an important attribute in the successful job performance of low-aptitude soldiers.

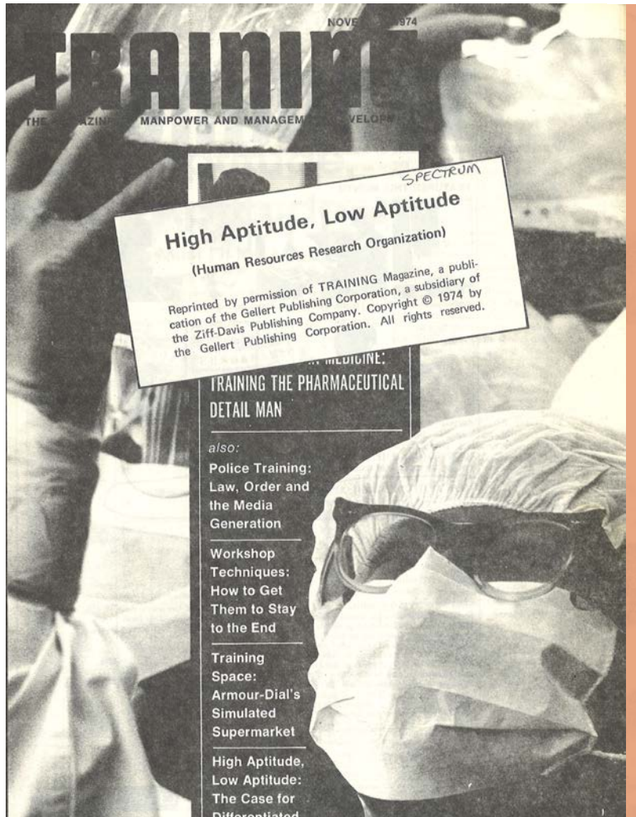
Under **PROJECT READNEED** researchers examined the literacy demands of a variety of Army jobs. They did this by developing a special formula that permitted an estimation of the reading grade level needed to read and comprehend Army manuals. They then applied the formula to samples of reading material from seven jobs to which marginally literate men might be assigned. When project personnel compared the average reading level of men in remedial programs and lower aptitude soldiers, they found that the requirements far outstripped their abilities. Whereas these men typically were reading at the 5th to 8th grade level, the materials required skills at the 10th grade or higher. In fact, researchers noted that the goal of the remedial reading program in the Army at that time (5th grade level) was insufficient to adequately prepare these men for their on-the-job reading needs. These findings led to the development of a functional literacy program (see *Training* on page 78).

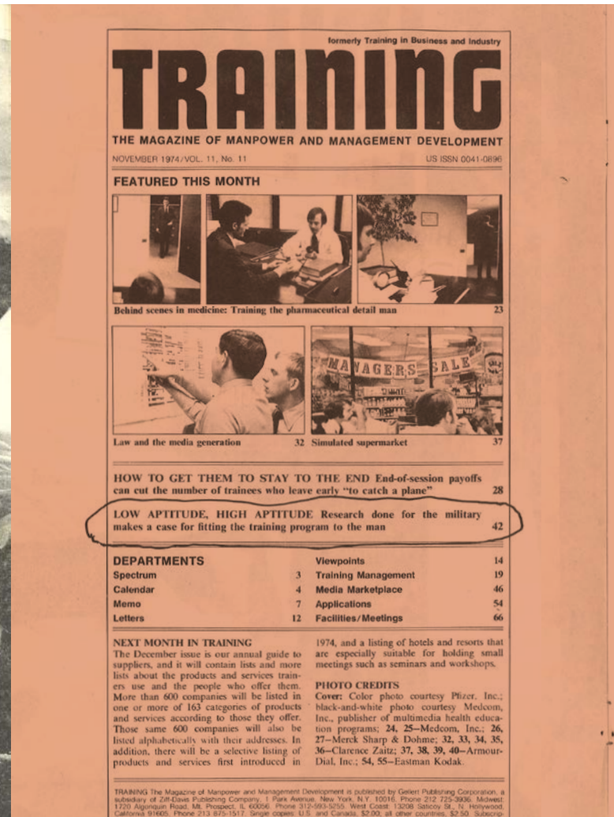
Finally, **PROJECT SPECTRUM** sought to identify instructional strategies that were most suitable for lower-aptitude individuals. In this case, researchers began by specifying instructional principles judged most feasible in an operational setting for low- and high-aptitude trainees, and testing various instructional arrangements or systems employing these guidelines. For low-aptitude soldiers these principles included having feedback occur contemporaneously with performance, reducing dependency on reading as much as possible, and requiring hands-on learning activities. For higher aptitude trainees the guidance included depending on self-instructional materials and enhancing autonomy in the learning process to the degree possible. Various instructional programs were developed employing these guidelines. These were tested, discarded, modified, and accepted depending on the results obtained. The findings indicated that differential training strategies for men of varying aptitude are actually more cost-effective. Although differences between the two groups were evident, lower-aptitude men did significantly better in situations that maximized personal interaction during instruction. These techniques were found to be more effective and to take less time than other approaches. By contrast, higher aptitude soldiers benefited from autonomy and self-pacing in the instruction setting.

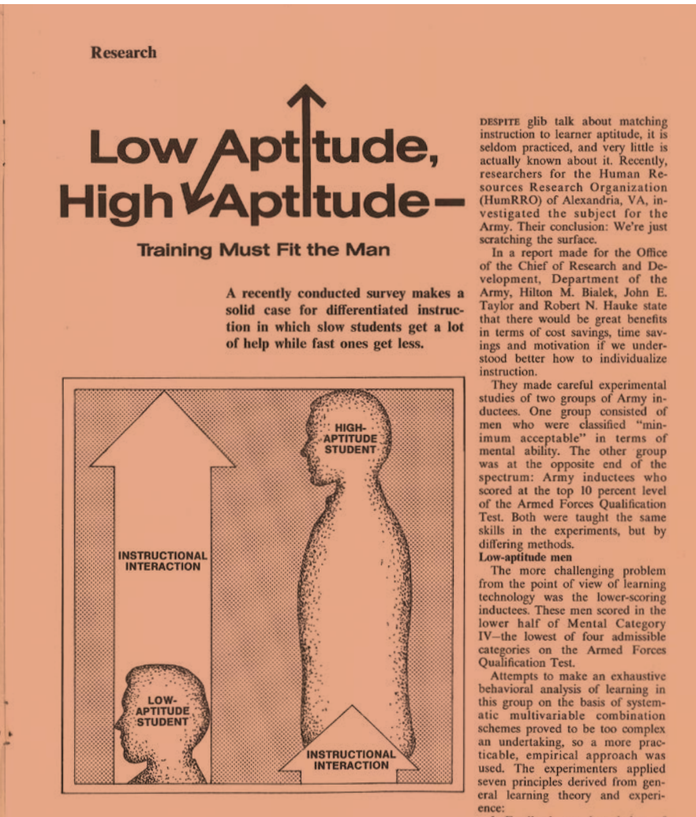




HumRRO's work under work unit Spectrum was summarized in an article in Training *magazine.*







CHAPTER 3

BASIC RESEARCH

ONE OF THE CHALLENGES HumRRO faced in its early days was recruiting personnel from largely academic environments to an applied research and development setting. Experimental psychologists—particularly brand new experimental psychologists—were interested in running rats and delving into the depths of the human psyche. Attracting them to work on real-world problems in largely uncontrolled settings could be problematic. To ease this situation, Meredith Crawford created a program through which basic research could be performed under HumRRO's aegis. From approximately 1958 through 1974, 21 Basic Research Programs were completed. The range of topics studied is evident through the reports that resulted.

SOME EXAMPLES ...

- **Effects of a multiple DRL-DRH schedule of collective reinforcement on shaping the cumulative response rate of three-man teams**
- **Paired associate transfer following early stages of list I learning**
- **A checklist of feelings of hostility**
- **How to make a training film that really works**
- **Paragraph recall as a function of content word load**
- **The relationship of intelligence and authoritarianism to behavioral contagion and conformity**
- **Initial research on structural characteristics of arithmetic problems**
- **A study of the separation of idea production and evaluation in individual problem solving**
- **Vicarious attitude change and the design of "message" films: Application to race relations**
- **An investigation into the source of error in stadimetric range**

1971—1980

TESTING

MUCH OF HumRRO's WORK in the personnel testing arena during this period was driven by the introduction into the Army of the new Enlisted Personnel Management System (EPMS). One essential element of this program was that soldiers be assessed through performance-oriented tests to determine their eligibility to be promoted or to reenlist. Up until this time, such assessments had been conducted using Military Occupational Specialty (MOS) tests, which were given annually to soldiers at the E-5, E-6, and E-7 levels. These were largely knowledge-based, multiple-choice tests that many complained had little to do with an individuals' ability to actually perform his or her job. The Army determined that this situation would change under EPMS.

In **PROJECT MODTEST**, researchers investigated the feasibility of developing a functionally integrated job performance test for a combat MOS and examined the feasibility of such a test with reference to sampling tasks, developing parallel forms, scoring reliability, indicating a range of mastery, and evaluating crew proficiency. The term "functionally integrated" described situations in which each task was tested in a functional context that maintained its logical relationships to other, related tasks. Project staff chose a particular job for developing prototype tests. They then identified tasks to be tested and determined standards that demonstrated proficiency. Finally, they developed test scenarios and scoring criteria and conducted a pretest of the instrument. This work demonstrated the feasibility of the procedures used, although the researchers acknowledged that the process, if done correctly, required a substantial investment of resources.

Starting in 1974, HumRRO worked with the Army on the concept of Skill Qualification Tests, or SQTs. The concept behind the SQT was simple: each soldier's job proficiency would be evaluated annually using valid and reliable tests. For the first time, Army testing would be a training function rather than a personnel function. The execution of the idea, however, was not so simple. There were some 800,000 soldiers in 200 different jobs at five different skill levels located throughout the world. In addition, there were 26 different proponents for the jobs, and little-to-no infrastructure to support the test development and implementation process. HumRRO's involvement was primarily centered on the creation of procedures for everything from task selection and analysis to validation and administration. This was all accomplished by a small group within HumRRO and the Army under very stringent timelines.

Under **PROJECT PERFORM** HumRRO researchers worked with Army subject matter experts (SMEs) in eight combat MOS to develop performance objectives for "critical" and "important" job tasks. Four service branches took part in this effort: Infantry, Armor, Field Artillery, and Air Defense. Four levels of commonality were found across jobs: common (applicable to all 8), semi-common (appropriate to MOS in 2 or more branches), branch (required in only one branch), and MOS (unique to a specific MOS). Overall, project staff and SMEs identified some 1,800 performance objectives. HumRRO then conducted a field investigation to determine the potential reliability, validity, and feasibility of prototype performance tests developed from these objectives. The results of the investigation included a series of recommendations for improving hands-on performance testing under the EPMS. This work was extended further in **PROJECT ASSALT**, which focused on the feasibility of performance-based tests in high complexity MOS.

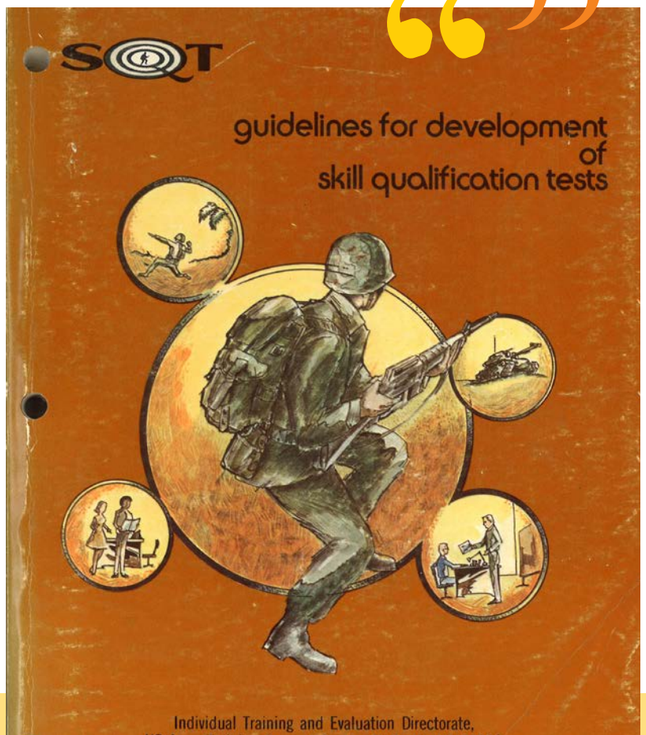
The move to performance-based testing under EPMS required an extensive rollout of a concept that was largely unfamiliar to training and testing personnel in the field. HumRRO was integrally involved in not only the development of the concept in the Army, but also the creation of materials to guide the construction of the new tests so that the results would be reliable and valid.

Under **PROJECT SQT**, HumRRO staff examined the feasibility of extending the test development work they had done for Infantry jobs to other occupational series. This required that researchers work with staff from a number of Army Service Schools, including Armor, Air Defense, Signal, Military Police, Ordnance, Institute of Administration, Engineers, and Quartermaster. The goal was to examine the content of the instructional materials at each school and determine the degree to which performance-oriented tests could be developed. The primary outcome of this work was the volume *Guidelines for the Development of Skill Qualification Tests*. This manual provided detailed instructions to test-developers for the creation of the three types of assessments that grew out of earlier work: hands-on, written, and performance certification. The authors set out a systems approach to SQT development, including determining performance measures, identifying test conditions, preparing instructions for examinees and scorers, and conducting field tests of the instruments/procedures developed.

HumRRO followed up on this work in Projects **SIFTED** and **VALID**, which involved the creation of a workshop on constructing and validating SQTs. Training developers successfully created instruction that met the Army's primary criteria of being exportable, self-paced, and efficient. HumRRO presented the training to 20 representatives of 13 Army Service Schools who, in turn, delivered it to 213 participants across the country. HumRRO personnel also took the workshops on the road, with three researchers presenting them at 13 different locations over a 6-month period.

In 1978, the Division of Military Psychology of the American Psychological Association presented its Military Psychology Award to HumRRO for the organization's combined work in the development and implementation of SQTs. The citation read, in part:

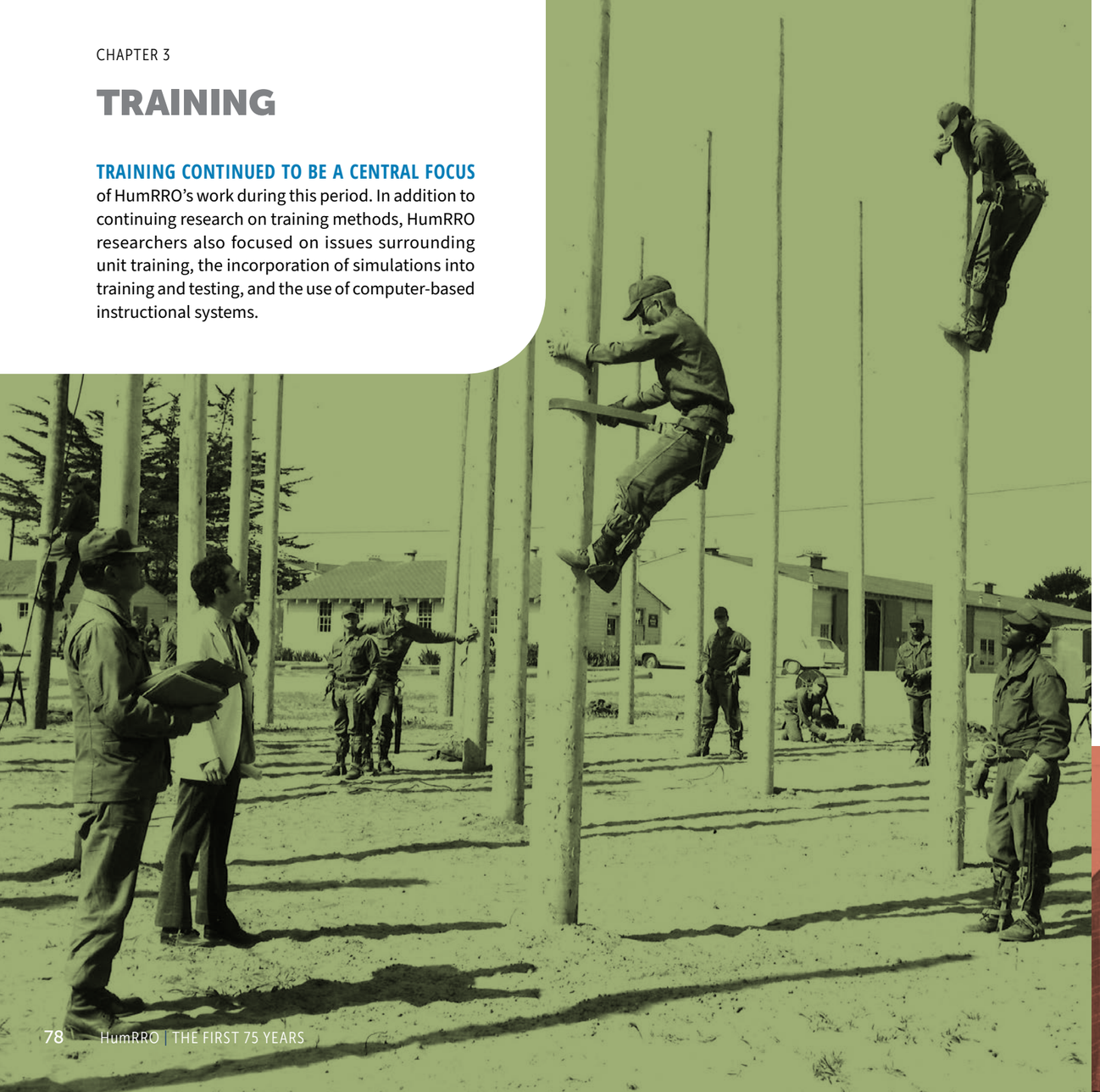
> *The work is exemplary with respect to cooperation among organizations, generality and applicability of methodology, institutional change, and product utilization. The Skill Qualification Testing Program provides the quality assurance mechanism for the Army enlisted training and the foundation for the Army Enlisted Personnel Management System. The effort yielding this meritorious contribution was massive although time compressed and policy constrained.*



CHAPTER 3

TRAINING

TRAINING CONTINUED TO BE A CENTRAL FOCUS of HumRRO's work during this period. In addition to continuing research on training methods, HumRRO researchers also focused on issues surrounding unit training, the incorporation of simulations into training and testing, and the use of computer-based instructional systems.



Methods

With the introduction of the All Volunteer Force, the Department of Defense—and particularly the Army—was forced to deal with a wider aptitude range among new recruits. This posed problems in training. The standard lecture format, which worked well with soldiers who score above average on the Armed Forces Qualification Test (AFQT), was leaving those of lower aptitude behind. When instructors made adjustments to accommodate those who needed more time to absorb the material, the result was frustration and boredom on the part of those with higher abilities. With this in mind, HumRRO researchers undertook work unit **APSTRAT**. The goals were to identify or devise a set of instructional methods that would meet the needs of trainees of various aptitudes, and to develop and test a complete training system based on those methods.

As a first step, HumRRO researchers performed a curriculum analysis of the Field Wireman training course. This entailed preparing behaviorally stated objectives for every task in the course. The project team then developed several alternative media for selected course modules, including programmed texts, slide-tape presentations, workbooks, and games. Based on trial applications of the materials, researchers concluded that peer instruction was the method that brought about the best results in terms of mastery of the material by men of varying aptitudes. As an added benefit, they found that this method significantly decreased training time. After additional investigation, they developed a peer-instructional model that included five steps. During the observation phase, an advanced student—Private Smith—performs and describes a given task in a one-on-one session with a new student—Private Jones. The observer then becomes the observed in the *skill-acquisition* phase, with Smith serving as the Instructor as Jones performs the task. When 100% proficiency has been demonstrated, the job performance phase is initiated, with Private Jones demonstrating the task for an incoming trainee—Private Wilson. In the *peer-instructor* phase, Private Wilson performs the task under the tutelage of Private Jones. In the final step, Private Jones serves as an assistant who helps in the overall administration of the module. This process is repeated until all modules of the course have been presented.

The Army found trainees made significant gains in proficiency when the APSTRAT model was applied. Further, APSTRAT reduced academic attrition and enabled considerable training cost savings. The success of the pilot study led to the implementation of the model in the four other field wireman courses taught in the Army. Exploratory studies in two public school systems also yielded positive results from its application. As these results became known, HumRRO

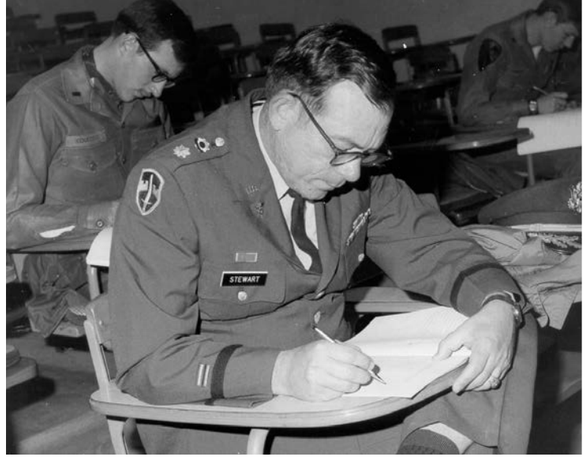


received inquiries from a wide variety of institutions with similar training problems.

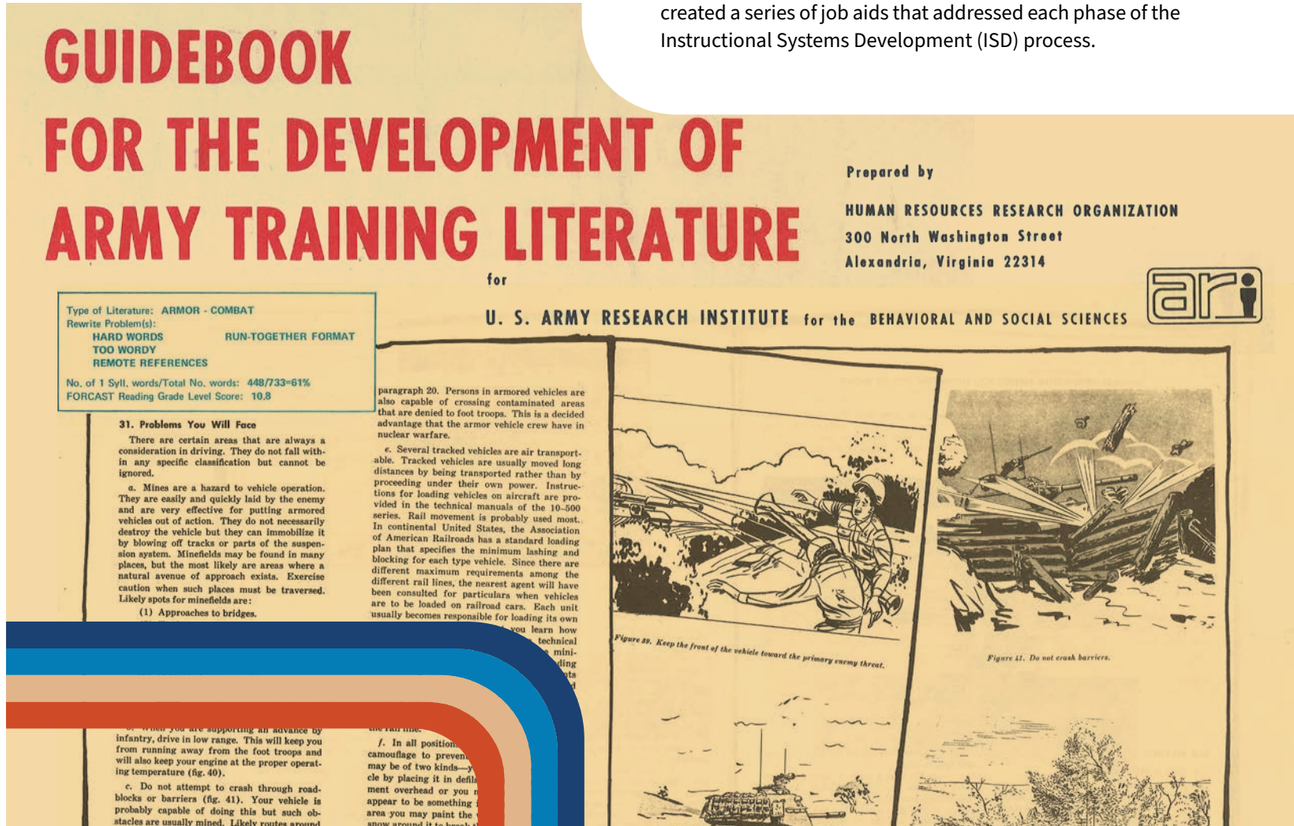
With the success of APSTRAT, the Army undertook plans to move toward a more generalized performance-oriented approach to training. Under work unit **VOLAR**, HumRRO researchers developed and evaluated the Experimental Volunteer Army Training Program (**EVATP**) at Fort Ord. Seven basic training content areas were converted to the new system (e.g., first aid, land navigation) along with 13 modules in advanced training (communications, night vision devices). The revised courses followed several principles that had emerged from prior HumRRO work and additional sources. These included implementing a performance-based system maximizing hands-on experience, allowing trainees to learn at their own pace to the degree possible, and incorporating more frequent testing to measure student gains and areas in need of improvement. Gradual conversion to the complete EVATP system took 4 months. This process involved some effort to convince long-time Army training personnel that the new process would be effective. Despite this initial reluctance, an independent evaluation of EVATP revealed significant performance gains on five of the seven basic course modules and seven of the nine advanced modules for which test data were available.

With these results in hand, the U.S. Continental Army Command directed that all training programs conducted in the Army be reviewed to ensure that they were challenging and attuned to changing needs. Revisions were to be conducted using a systems-engineering approach and to incorporate the principles of EVATP. HumRRO personnel took part in conferences in which performance-oriented training was introduced and explained and developed a videotape to guide school personnel in revising training. HumRRO personnel also visited a variety of schools to assist them with the conversion of their courses. This work soon spread to officer training, as well as the reserve training centers. One outcome of these efforts was the HumRRO-developed manual *Guidelines for the Conduct of Performance Oriented Training*. The Army Training and Doctrine Command (TRADOC) printed 49,000 copies of this document, which was then distributed to all Army Training Centers. They reported that the *Guidelines* quickly became the "bible" for Army trainers.

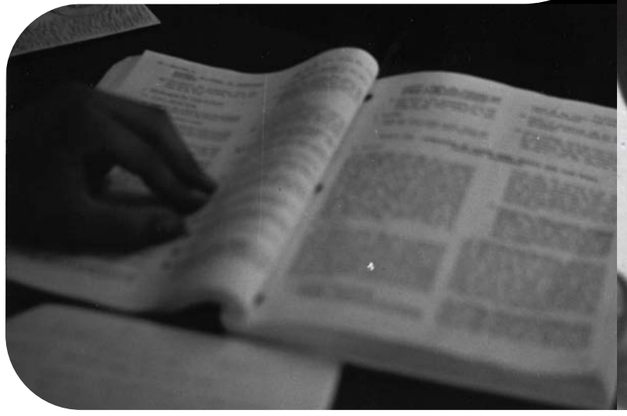




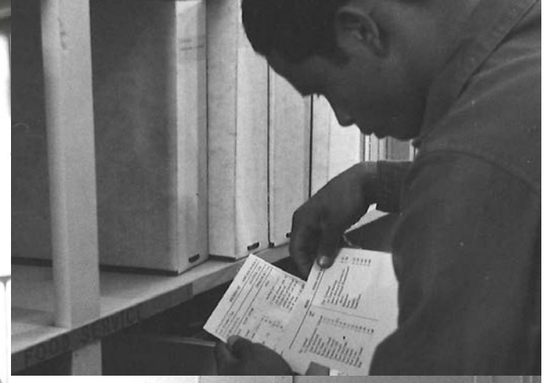
Several other HumRRO products became mainstays of the Army training literature. Under **PROJECT ATL**, HumRRO personnel developed the *Guidebook for the Development of Army Training Literature*, which constituted a job aid for the writers of performance-oriented training documents. The Guide included step-by-step instructions for the development of operator and maintenance manuals. **PROJECT INTERFACE** resulted in the volume entitled *Designing Printed Instructional Materials: Content and Format*. This publication incorporated specific guidelines for the various phases of the design process, including message analysis, clustering ideas, and structuring idea clusters in the development of course outlines. Finally, under **PROJECT IDA**, HumRRO researchers created a series of job aids that addressed each phase of the Instructional Systems Development (ISD) process.


GUIDEBOOK
FOR THE DEVELOPMENT OF
ARMY TRAINING LITERATURE
for
U. S. ARMY RESEARCH INSTITUTE for the BEHAVIORAL AND SOCIAL SCIENCES
Prepared by
HUMAN RESOURCES RESEARCH ORGANIZATION
300 North Washington Street
Alexandria, Virginia 22314
ari
Type of Literature: ARMOR - COMBAT
Rewrite Problem(s):
HARD WORDS
TOO WORDY
REMOTE REFERENCES
RUN-TOGETHER FORMAT
No. of 1 Syll. words/Total No. words: 448/733=61%
FORCAST Reading Grade Level Score: 10.8
31. Problems You Will Face
There are certain areas that are always a consideration in driving. They do not fall within any specific classification but cannot be ignored.
a. Mines are a hazard to vehicle operation. They are easily and quickly laid by the enemy and are very effective for putting armored vehicles out of action. They do not necessarily destroy the vehicle but they can immobilize it by blowing off tracks or parts of the suspension system. Minefields may be found in many places, but the most likely are areas where a natural avenue of approach exists. Exercise caution when such places must be traversed. Likely spots for minefields are:
(1) Approaches to bridges.
paragraph 20. Persons in armored vehicles are also capable of crossing contaminated areas that are denied to foot troops. This is a decided advantage that the armor vehicle crew have in nuclear warfare.
e. Several tracked vehicles are air transportable. Tracked vehicles are usually moved long distances by being transported rather than by proceeding under their own power. Instructions for loading vehicles on aircraft are provided in the technical manuals of the 10–500 series. Rail movement is probably used most. In continental United States, the Association of American Railroads has a standard loading plan that specifies the minimum lashing and blocking for each type vehicle. Since there are different maximum requirements among the different rail lines, the nearest agent will have been consulted for particulars when vehicles are to be loaded on railroad cars. Each unit usually becomes responsible for loading its own
Figure 20. Keep the front of the vehicle toward the primary enemy threat.
Figure 41. Do not crash barriers.
infantry, drive in low range. This will keep you from running away from the foot troops and will also keep your engine at the proper operating temperature (fig. 40).
c. Do not attempt to crash through roadblocks or barriers (fig. 41). Your vehicle is probably capable of doing this but such obstacles are usually mined. Likely routes around

As mentioned previously, under **PROJECT READNEED**, HumRRO researchers determined that the literacy demands associated with Army manuals outstripped the abilities of many soldiers at the time. Further, existing remedial programs were not aimed at a sufficiently advanced level to overcome such problems. **PROJECT FLIT** (Functional Literacy) was initiated to develop a prototype literacy training program for the Army that would provide a level of functional literacy to support minimal job reading requirements. After visiting remedial programs at various sites, researchers concluded that, to be effective, literacy training of short duration (6 weeks) had to be directed at the kinds of reading tasks the students encountered in training and on-the-job. Therefore, one of the first changes made to the program was to schedule it following basic training when the occupations of soldiers were known. This meant that the subsequent literacy instruction could focus on materials that they would actually be using in advanced individual training and beyond. The program itself was structured around various activities such as using a table of contents, abstracting information from tables and graphs, locating information in the manual text, and so on. Soldiers were tested regularly and recycled as necessary to ensure adequate progress. Evaluation results showed adequate gains in reading level. Overall, 28% of evaluation subjects attained a general reading grade level of 7, while 57% met this criterion with job-related reading tasks. These gains were quite substantial given the entry-levels of the students and the short training time, and compared very favorably with other military literacy programs in effect at the time.











Unit Training

During the 1970s, the Army sought to decentralize training by shifting responsibilities for this function to lower levels of command (e.g., platoon, squad/crew). This move was necessitated by the need to get soldiers up to speed more quickly and to cut training costs. However, personnel at lower levels were concerned that they would be unable to meet individual skills training demands given their existing responsibilities. Having established the foundation for performance-based training, it was natural that HumRRO personnel would be involved resolving such issues as this doctrine was filtered down to the unit level.

After surveying the state of in-unit training and methods for improving it, the Army's Board for Dynamic Training concluded that preparation for these responsibilities needed significant improvement. Researchers found unit personnel to be well schooled in their military specialties. Officers and NCOs, through experience, provided capable leadership and direction. However, for the most part, these personnel were inadequately prepared to serve in the roles of trainer and/or training manager. Overall, relatively few hours of instruction were devoted to *how to* develop and conduct training. The goal of **PROJECT UTRAIN** was to determine the requirements for this activity as conceptualized under decentralization, analyze the current status of instruction on how to conduct training, and develop and evaluate an experimental program of training instruction for unit personnel.

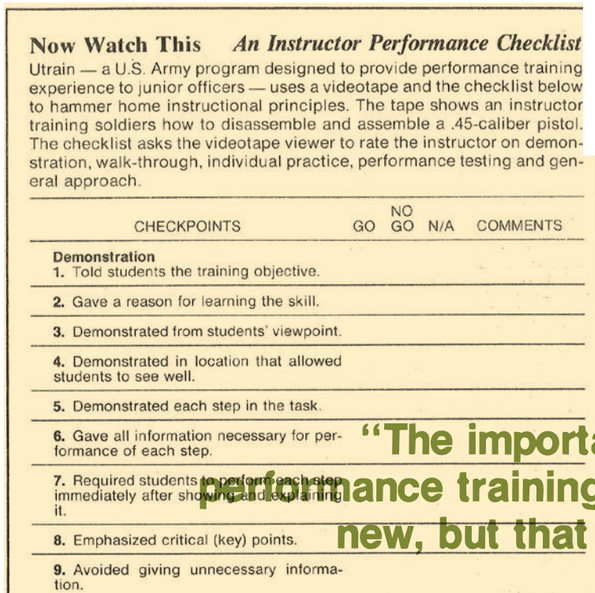
The result of these efforts was a 10-hour block of instruction on performance-oriented training. The concept was that this would be initially implemented and validated at the U.S. Army Infantry School, with further roll-out to follow depending on the results. However, after the first trial presentation of the course, interest was so high that Army officials decided to speed up its distribution. Additional interest was sparked when the pilot program was delivered to the Seventh U.S. Army Training Center in Vilseck, Germany and to representatives of the six U.S. Army Europe NCO Academies in Frankfurt.

The final 10-hour course was designed for small group administration. It began with a 3-hour session covering such topics as techniques of effective demonstration, coaching, and testing. The remaining time was devoted to supervised practice in the preparation and delivery of performance training on short Army tasks. After approval by TRADOC, the course was disseminated to all Army schools. Other uses followed. The materials were included in the curriculum for NCO courses, as an instructor-training course for faculties at school and training facilities, and as instructor training for Army Reserve and National Guard trainers.

HumRRO conducted a similar effort for the 7th Infantry Division at Fort Ord, California, in the late 1970s. **PROJECT DIVSKILL** focused on providing assistance to the division in implementing technical aspects of performance-based training, producing a set of draft programs of instruction for use by training managers who conduct individual training in units, and to investigate the relative effectiveness of alternate methods of teaching managers and instructors to implement performance-based training. This resulted in two training programs, using directed practice and self-study approaches.

Small Independent Action Forces (SIAF) are U.S. or Allied small combat elements designed to carry out operations independent of parent units in insurgency environments. Such units operate under arduous and stressful conditions. Success frequently depends on high levels of individual and team performance. HumRRO staff undertook a three-stage process to develop materials and procedures for selecting and training personnel to serve in SIAF units. Researchers first analyzed the operational requirements and job-relevant activities of such units. Based on this analysis they developed procedures for selecting personnel along with training programs for 25 critical content areas. A composite training test was created and used to validate the selection and training. In the end, a complete battery of valid and reliable selections tests for potential SIAF members resulted, along with an 800-hour training program.

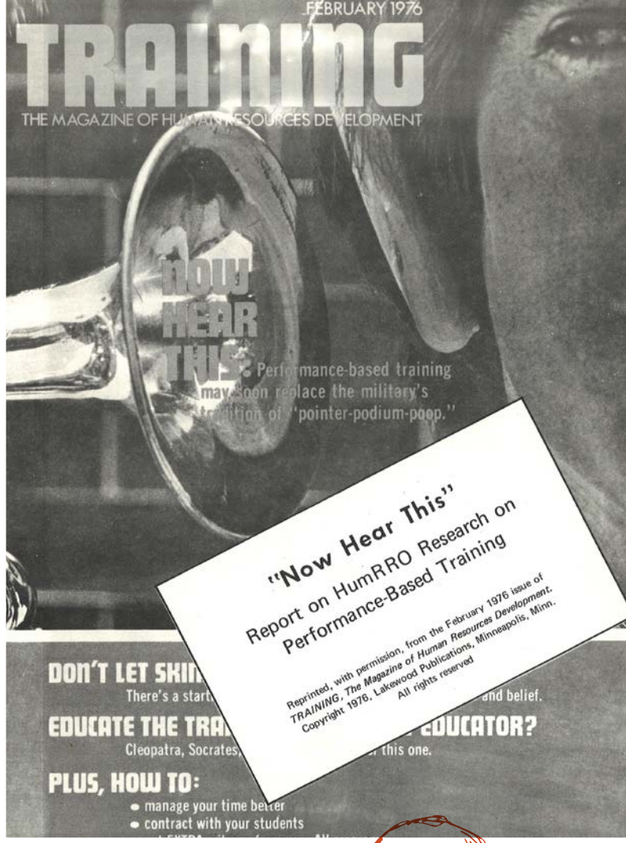
Another emphasis in HumRRO work of this period was the training of officers and other personnel in leadership positions. Projects **PURFECT** and **CAMBCOM** used a systems approach to identify battalion-level command and control, as well as the knowledge, skills, and thought processes required to perform those functions. This work was used in **PROJECT COMTRAIN**, in which HumRRO personnel were charged with developing and testing an improved system for training Battalion Commanders and their staff to perform combat and control functions. One unique feature of this latter effort was the use of gaming simulation technology for the executive portion of the Command Post Exercises (CPX). In fact, simulations were another significant portion of HumRRO's work during this decade, just as they had been in the past.

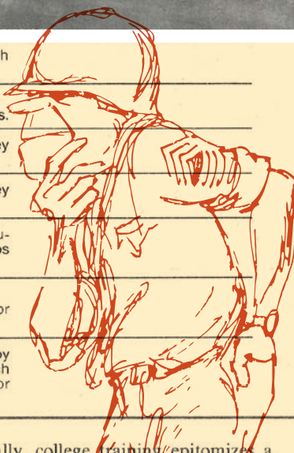


Now Watch This *An Instructor Performance Checklist*

Utrain — a U.S. Army program designed to provide performance training experience to junior officers — uses a videotape and the checklist below to hammer home instructional principles. The tape shows an instructor training soldiers how to disassemble and assemble a .45-caliber pistol. The checklist asks the videotape viewer to rate the instructor on demonstration, walk-through, individual practice, performance testing and general approach.

CHECKPOINTS	GO	NO GO	N/A	COMMENTS
Demonstration				
1. Told students the training objective.				
2. Gave a reason for learning the skill.				
3. Demonstrated from students' viewpoint.				
4. Demonstrated in location that allowed students to see well.				
5. Demonstrated each step in the task.				
6. Gave all information necessary for performance of each step.				
7. Required students to perform each step immediately after showing and explaining it.				
8. Emphasized critical (key) points.				
9. Avoided giving unnecessary information.				
10. Paced demonstration in accord with the students' learning ability.				
Walk-Through				
1. Prevented students from making errors.				
2. *Told* students what to do when they needed that kind of help.				
3. *Showed* students what to do when they needed that kind of help.				
4. When coaching, always required students to perform all steps or parts of steps he demonstrated.				
Individual Practice				
1. Told students when they were ready for skill training.				
2. Prompted students when necessary by asking questions ("How do you do (such and such)?" "What does you do now?" or the like.				





"The important thing about performance training is not that it is new, but that it is effective."

from field interviews that platoon leader is still a key position in the

cally, college training epitomizes a lecture-dominated, information-ori-

Simulations

HumRRO's Aviation Division at Fort Rucker, Alabama, continued to be heavily involved in the development and evaluation of training programs for Army aviators using simulation devices. At the same time, they vigorously pursued such projects for other agencies. Under **PROJECT SHAHIN**, researchers provided input on the development of simulators for the Iranian forces and had responsibility for creating and implementing simulator training programs on-site in Iran. Events there precluded completion of this effort. During this period, however, HumRRO undertook another major effort for the U.S. Coast Guard (**AVTRAIN**). Researchers conducted a detailed analysis of Coast Guard flight missions and activities as a basis for defining training and simulator requirements for the USCG Aviation Training Center in Mobile, Alabama. This involved preparing documents and assisting the Coast Guard throughout the simulator procurement effort. In addition, HumRRO developed the programs for flight and simulator instruction. The simulators themselves (called the digital Variable Cockpit Training System) and associated training programs were implemented with great success. HumRRO personnel conducted additional aviation studies during this period, including a comprehensive examination of long-term retention of flight skills (**RETAIN**) conducted for the Air Force Office of Scientific Research, and a study of Naval Flight Officer training conducted for the Chief of Naval Education and Training (**NFO**).

Similar concerns existed during this period over rotary aircraft training. Research had demonstrated that available training devices were producing no real training cost reductions, nor were they suitable for use in many portions of the existing training program for pilots. To address these issues, the Army invested resources in having manufacturers develop the Synthetic Flight Training System (SFTS), with the goal of providing standardized flight instruction with objective evaluation of performance and the ability to provide periodic retraining on an as-needed basis. The first subsystem of the SFTS was Device 2B24, a simulator for the Army's primary helicopter at the time, the UH-1H. Among the features of this device were the partial automation of instructor functions, augmentation of trainee feedback through playbacks of recorded performance, and a degree of trainee control over exercises to facilitate self-instruction.

HumRRO personnel initiated a three-phase test of Device 2B24. First, they examined the workability of the device from a training standpoint. They used experienced personnel for this purpose, and developed training activities to test the system's various functions. The process uncovered several problems, and HumRRO worked with Army and manufacturer personnel to overcome them. As this process was underway, researchers also developed an instrument flight training program based on current training technology and the features of the device. Finally, they undertook a transfer-of-training study in which 16 randomly selected students participated in the prototype simulator training. Their total training time and time required to pass the instrument check ride was compared to that of conventionally trained students. The results indicated that the experimental group required only 4 hours of aircraft familiarization before taking the Standard Instrument Rating check ride, on which they received grades similar to conventionally trained students. Simulator training was associated with considerably less aircraft time, making it highly cost-effective. Furthermore, emergency procedures training was considered to be safer and more comprehensive using the simulator device. HumRRO recommended further development of the features of the 2B24 so that it could more completely satisfy its intended mission.

Simulations of another sort were the focus of **PROJECT SIMFAC**, a system for simulating tactical engagement for unit training in combat arms. Although the Army Research Institute, among others, had been involved for some time in the development and implementation of such programs, research on their design and effectiveness had been hampered by the fact that it typically took place in field settings where uncontrolled events and resource limitations were commonplace. The goal of this project was to design a simulation-based facility that lent itself to effective and efficient research on tactical skill acquisition and retention, leader behavior, and tactical training developments. The first task undertaken by HumRRO staff was to formulate the functional requirements for such a system, taking into account both its fidelity and the research interests. The research team then developed a manual board game to provide some indication of the degree to which the specifications could be met. The new device was tested and revised to correct any deficiencies encountered. As a final step, they delineated specifications and made plans to automate the board game in a realistic, interactive combat simulation including weapons, vehicle, communications, and human systems factors and shortcomings.



Computer-Based Instruction

Beginning in the late 1960s and continuing throughout the next two decades, HumRRO played a major role in the research and development surrounding computer-based instruction. This work was funded through a variety of sources, including private grants, the National Science Foundation, the U.S. Postal Service, and, of course, the United States Army. Projects for the Army focused on practical applications that could address the need to train soldiers in a more efficient and cost-effective manner. Computer Based Training (CBT) was seen as a potential solution in this regard because it provided opportunities for self-paced instruction that could be delivered in a dispersed manner while decreasing dependence on more labor-intensive stand-up training.

One of the first projects HumRRO staff undertook in this arena was called **IMPACT**. The goal of this massive, 5-year effort was to produce prototypes of computerized training for Army personnel. IMPACT resulted in a score of technical reports, computer programs, and their associated documentation. HumRRO developed a total Computer Assisted Instruction (CAI) system that focused on four facets: instructional content, hardware, software, and



Instructional Decision Models (IDMs). Researchers undertook four successive cycles of development and testing. The first two resulted in the development and test of a prototype CAI system. The heart of the effort was the evolution of the IDMs, which consisted of sets of rules for matching the presentation of material to the students' momentary needs, interests, and capabilities.

The overall approach involved:

(a) Mapping the subject matter,

(b) Analyzing student characteristics,

(c) Developing decision rules for presenting subject matter as a function of student characteristics, and

(d) Evolving an algorithmic representation of the decision rules.

As part of the work, HumRRO staff produced a software package that provided a flexible and easy-to-use technique for creating, managing, and modifying instructional material for presentation via computer. The initial instructional content was the COBOL programming language. This was one of the most extensive CAI programs to have been developed at that time, including 30 hours of instruction. Ultimately, the IMPACT team delivered to the Army specifications for appropriate design of CAI hardware and software subsystems usable for Army-wide implementation.

PROJECT CATALYST was an offshoot of IMPACT, which also received support from the National Science Foundation. Under this work, HumRRO staff developed a powerful interactive graphics system that was able to display dynamic, 3-dimensional real and abstract "worlds." Called the Color Half-tone Graphics Environment, or CHARGE, the system was one of the most advanced of its kind at the time.

Other CBT-related projects undertaken by HumRRO during this period included work for the U.S. Postal Service that resulted in a training system for letter sorter machine operators. Called **POSTALAIDS**, this system included a high-quality TV screen that showed facsimiles of real mail, and a keyboard exactly like that used in the actual letter-sorting task. The system was able to keep track of student progress, analyze problem areas, and provide tutorials in areas where students seemed to be having trouble. Images of mail were computer generated and virtually unlimited in number. The researchers developing the postal training system used CHARGE for this purpose, allowing for a wide variety of script and font types, as would be encountered on the job. Evaluation data showed significant gains in accuracy amongst system users as compared to those trained under previous simulation methods.

Under project IMPACT, HumRRO personnel developed and tested a prototype computer-assisted instructional system.





Under project POSTALAIDS, HumRRO developed training and simulations for the letter sorter position.

During this period, HumRRO also conducted several projects concerned with the use of computers in schools for the National Science Foundation (NSF). The goal of **PROJECT CASES** was to assess the impact, benefits, limitations, and costs of computer innovations in education through a case-study approach. Researchers used an exhaustive selection procedure that included requesting nominations for outstanding examples of computer use in schools from a wide array of professionals in the field. They interviewed, by telephone, staff of the 370 institutions identified through this process. The types of information collected included the size of the student body, the types of computer equipment available, and the uses to which they were put. An *Academic Computing Directory* resulted from these efforts. The nominees were then invited to respond to a series of questions regarding their computer usage as it related to one or more categories of excellence (e.g., institution productivity, student achievement). Project staff and expert consultants reviewed the responses, identifying exemplars within each area representing different institutions types (level, size). Finally, ten institutions were selected for in-depth study, the results of which were published in the book *Instructional Computing: Ten Case Studies*. For each institution, the book provided information on the history of their computer use, costs, student accomplishments, and courses offered that use computers. Points of contact for each school/system were included so that the institutional knowledge and experience could be shared with schools throughout the country interested in incorporating computers into their curricula.

In other projects for NSF, HumRRO personnel sought to determine optimization procedures for meaningful CAI systems through the iterative development and testing of a series of Instructional Decision Models. This research demonstrated the capability of IDMs to be adaptive to the needs of students; however their utilization was found to vary for different subpopulations. The report resulting from this research highlighted future directions in this regard, including the inclusion of additional decision-making and learner-control features. Two additional books also resulted from NSF-sponsored work. The first was the result of a national conference convened by HumRRO entitled "Computer Technology Forecast: Potential for Education." The resulting volume, *Computers and Communication, Implications for Education*, contained articles by experts in the field addressing such topics as storage technology, the impact of improvements in man-machine interfaces, and the distribution of educational resources. The second book, *Learning Alternatives in U.S. Education: Where Student and Computer Meet*, drew heavily on prior work done by HumRRO in the area of instructional technology and was intended to provide concrete examples of how computers can be effectively applied in the educational arena along with advice for doing so.

HumRRO PRESIDENTS

WILLIAM McCLELLAND

WILLIAM MCCLELLAND was born in New York City on November 8, 1918. He grew up in White Plains, New York, and graduated from high school there in 1936. Subsequently, he attended Brown University, where he graduated Phi Beta Kappa, magna cum laude, in 1941 with a degree in psychology. The next year he entered the Army Air Corps, serving first as an enlisted man and then as an officer assigned to the Psychology Program. He was separated from active duty at the end of World War II with the rank of Captain.

After the war, McClelland entered the University of Minnesota, where he earned a master's degree in psychology in 1946. He served as an instructor at the school for the next two years while he worked on his dissertation, which was awarded in 1948. At that time, he returned to his alma mater, Brown University as an assistant professor of psychology and assistant to the dean of the college. From 1951 to 1955, McClelland was a supervisory physiological psychologist with the U.S. Air Force, conducting navigator training research and proficiency analysis. In 1955, he joined the HumRRO staff as the Director of the Training Methods Research Division.

McClelland became a deputy director of HumRRO in 1960 and was promoted to associate director in 1964. When HumRRO became an independent organization in 1969, his title changed to Executive Vice President. Upon the retirement of HumRRO's founder in 1976, the Board of Trustees unanimously elected McClelland HumRRO's second president. He served in that position until his death on March 16, 1979, at age 60.

In addition to his HumRRO responsibilities, McClelland held several other positions of note. He served as president of the District of Columbia Psychological Society and president of the Division of Military Psychology of the American Psychological Association (APA). With the latter organization, he also held the offices of Chair of the Committee on Structure and Functions of Council and was a member of the Education and Training Board and the Council of Representatives. He was a Fellow of both APA and the American Association for the Advancement of Science.

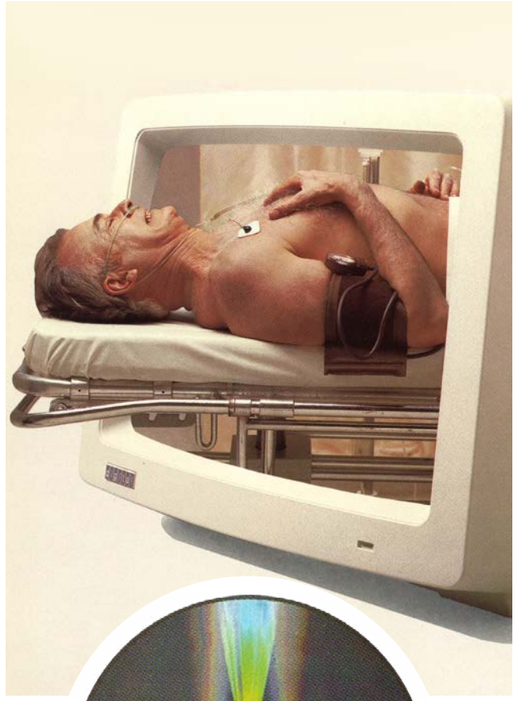




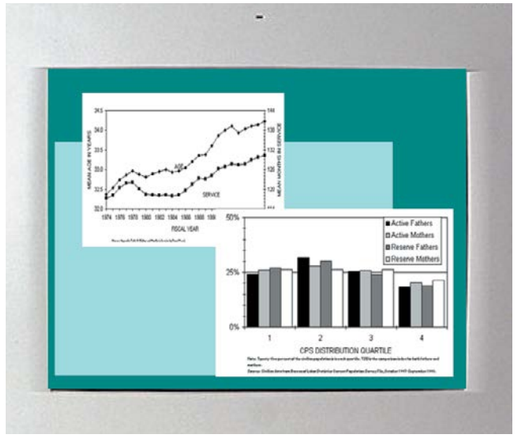
1971—1980

In 1979, McClelland was posthumously awarded the Military Psychology Award by APA's Division of Military Psychology. The citation said, in part:

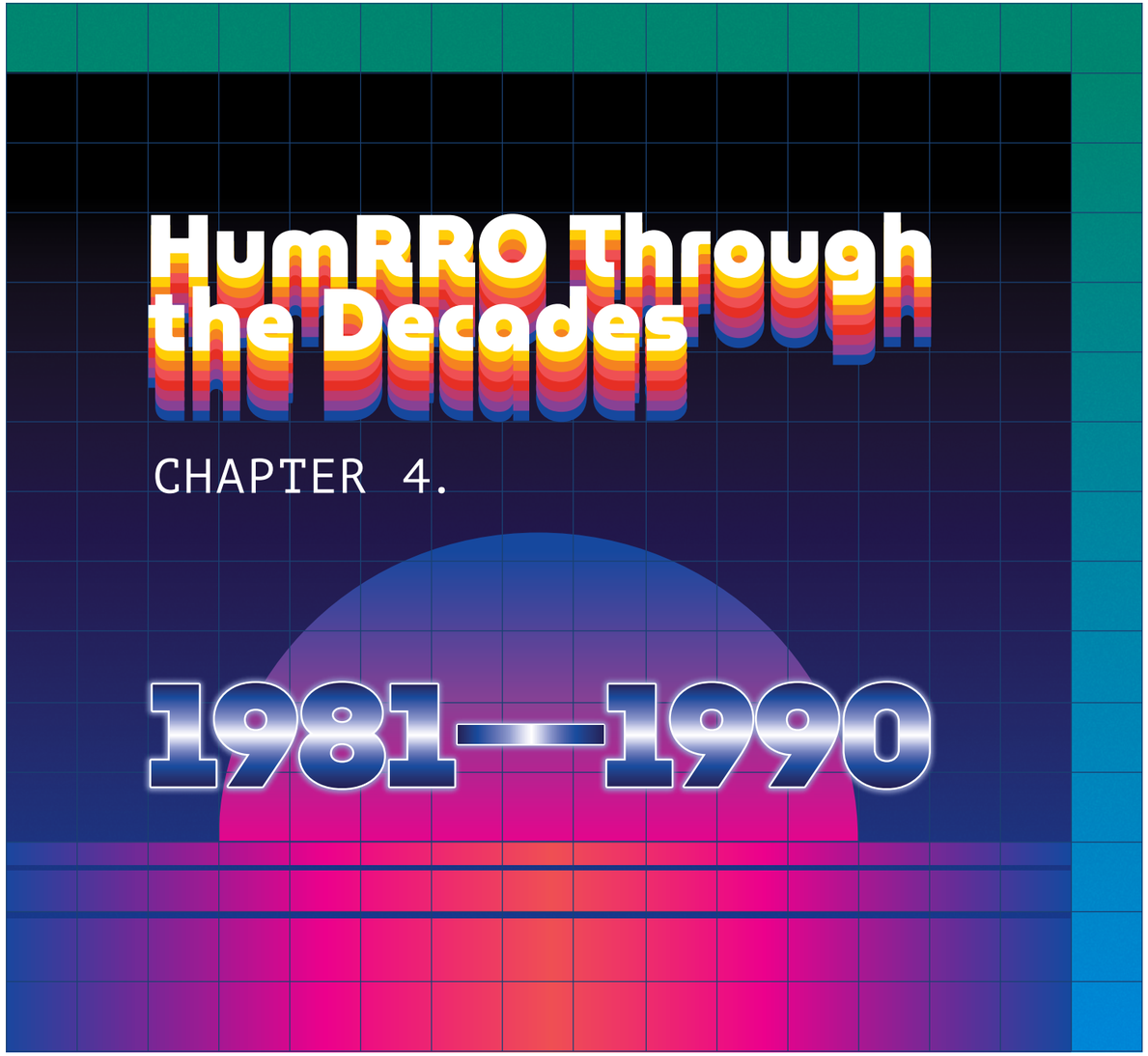
> *From student scholar, and among the pioneers in aviation psychology for the Army Air Corps during World War II, Doctor McClelland's professional career spanned almost forty years of academic, administrative, and research pursuits. His theoretical and practical contributions to our comprehension of the human learning process, and his executive leadership in the field of training technology for use in military and civil institutions alike, were achieved from nearly twenty-five years of service through the internationally esteemed Human Resources Research Organization, of which he was ultimately President. As such, his personal and professional contributions live on through the individuals and institutions whose lives he touched. Military psychology is one of those beneficiaries.*




Videodisc


SERVICE
FISCAL YEAR
CPS DISTRIBUTION QUARTILE
Active Fathers
Active Mothers
Reserve Fathers
Reserve Mothers




HumRRO Through the Decades
CHAPTER 4.
1981—1990



HumRRO staff gather for a group photo in front of the 1100 building. 1989.

CONTINUING CHALLENGES, NEW DIRECTIONS

THE CHALLENGES HumRRO FACED as it moved from a single-client agency to an independent organization continued long after this process was complete. In his report to the Board of Trustees of August 1981, President Singleton reported:

> *In many respects, FY81 was a trying year: further government support to the educational community all but vanished and HumRRO's prospects for new funding from that source have suffered. New starts in continuing areas of government need, notably DoD and the military departments, have been delayed or redirected as a consequence of the change in the Administration, resulting in a virtual drought of expected sole-source awards. Our performance in competitive procurements was disappointing, demonstrating to me the lack of focus in our marketing process.*

Although Singleton went on to qualify this position by pointing to several positive indicators, it was clear that many problems remained. Another blow came that year when HumRRO lost a large procurement for the development of a Basic Skills Education Program. Personnel had been hired in anticipation of this award, and a Basic Skills Education Division created. Several factors led management to challenge the government's decision in this case, something HumRRO has been loath to do before or since. In the end, the challenge was denied and the Division created for this work folded.

Another problem area centered on HumRRO's decision in the early eighties to purchase the Technical Education Center (TEC) from The George Washington University. TEC's mission was to provide job-related skills training, largely to individuals whose educational achievements left them ill equipped to vie for jobs in a competitive employment market. Much of this training was funded through the Comprehensive Employment and Training Act of 1973, commonly known as CETA. TEC had seemed a natural acquisition for HumRRO given the latter's long history in training research and development, as well as its mandate as a nonprofit to use its expertise in ways that give back to society. Unfortunately, the timing of the purchase was not fortuitous. Under the new Reagan administration, programs such as CETA received thorough, and not always friendly, scrutiny. TEC's struggle to stay afloat would be long, and cause difficulties for its new owner.

Another challenge faced during this period involved HumRRO's headquarters location. Since moving to the 300 North Washington Street location in 1963, HumRRO had been the primary tenant in the seven-story building. Because of this, the organization was paying far below market rate for the space in 1981 when its lease came up for renewal. Understandably, the landlord sought a substantial increase that would nearly triple this expenditure. Longtime HumRRO Chief Financial Officer Bill Smith entered into extensive negotiations to obtain a more favorable outcome.

One glimmer of hope was the prospect for obtaining a very large contract with the Army Research Institute (ARI) to improve the selection, classification, and utilization of enlisted personnel. HumRRO learned of this procurement early in its genesis, and immediately set about the task of forming a team that would be competitive, the members being the American Institutes for Research (AIR) and the Personnel Decisions Research Institute (PDRI). Considerable corporate resources were devoted to assembling the proposal, and a great deal hinged on obtaining the work.

As it turned out, the challenges inherent to this effort went beyond the technical. The delivery date for proposals was January 14, 1982. The staff involved worked furiously to design a huge program of research that would meet the Army's needs. Qualifications needed to be demonstrated, both in regard to previous work (such as HumRRO's highly visible presence in the area of Skill Qualification Test development), and through the proposed staff. The document itself was voluminous, and various personnel from all three firms took part in its review. As the date for submission neared, the intensity of these efforts grew.

TECircuits

HumRRO Technical Center **1986**

Award Winning TEC



From left to right, Robert Varma, Hayman Cash Register; Bernie Newman, Honeywell; Lisa Straus, TEC; Roger Williams, TEC; David Clarke, D.C. Council Chairman; Tom Pickett, and Wendell Baudy, Wang Laboratories; John Newkirk, Xerox.

On March 20, Chairman of the D.C. City Council, David Clarke, presented the school with a resolution commending HumRRO TEC for outstanding service to the community. Roger Williams, Vice President and Director of HumRRO, accepted the award, and members of HumRRO TEC's Industry Advisory Council attended the presentation.

The D.C. City Council voted on this resolution, which honored TEC for its high placement record. According to Mr. Clarke, the school provides a service not only in improving unemployment in the District, but also in providing careers that can last a lifetime for those who graduate from TEC's program.

Evening News Circuit

When Eugene Adams applied to NBI, a company renowned for top-of-the-line word processors, he lacked the knowledge required for a job as an entry-level technician. The company noticed, though, that he was an evening school student at HumRRO TEC. NBI decided to hire Eugene as a dispatcher, and upon completion of his training program at TEC, he has an automatic entry into a technical position at NBI. Eugene is just one example of the sort of student the evening school attracts—a working individual dedicated to the idea

Students come to school Monday through Wednesday evenings from 6:00 to 9:00, and on Saturdays from 9:00 to 5:30, for thirteen months.

The evening school has grown considerably since its inception in 1982 with twelve students. The program now boasts an enrollment of 96 students. HumRRO TEC is naturally proud of the evening school's growth. The school owes this growth, in part, to the expanding reputation of the program's quality. However, HumRRO TEC attributes an even larger part of the evening school's success to the dedication and ambition of the many students who

Secretary of Education, William Bennett, presents a certificate to a HumRRO TEC graduate while HumRRO Vice President and Director of TEC, Roger Williams (left) looks on.



January 13 was a frigid day. Early that morning the weather took its toll on the large tanks that sat atop the 300 building holding the water needed for the sprinkler system. The tanks succumbed to the temperatures and burst, sending a cascade of water through the upper floors of the building. Personnel not involved in the proposal effort were told to stay home. All others reported for emergency duty. They waded through water to get to their desks. Although individual word processing systems continued to operate, in some cases they looked like aquariums, with water literally sloshing in their screens. If there was one saving grace, it was that a copy of the near-complete proposal had been placed in the reproduction office on a high shelf. All was not lost.

This day became more widely infamous for other reasons. A snowstorm engulfed the city as the day wore on. Just before 4 p.m., Air Florida flight 90 taxied down the runway of Washington National Airport. Seconds later it landed in the frigid Potomac River, and people throughout the region—and country—sat transfixed as rescue efforts proceeded. Less than an hour later, an accident occurred on the city's Metrorail system, and three people died. With tragedy comes perspective.

In the end, the proposal deadline was met. On September 30, 1982, HumRRO signed the largest behavioral science contract ever awarded, a contract that in the end totaled some 23 million dollars. Dr. Saul Lavisky, HumRRO vice president, wrote, "in my 18-plus years at HumRRO, I have never seen such a concerted, focused, planned-in-advance grasping of a contract opportunity on the part of our organization." Jim Singleton wrote to the staff, "The award represents a conspicuous achievement in the professional community and offers a landmark opportunity to enhance the application of behavioral science in the management of military enlisted personnel. September 30, 1982 was a day on which we could all be proud of HumRRO."

HumRRO's net worth at the end of FY 1982 was approximately $471,000. The president reported that, "If the worst of the storm has passed, HumRRO has weathered a difficult period creditably." And yet, problems remained. TEC continued to lose money. The decision was made to invest funds for the "development of capability to facilitate industrial application of robotics and other classes of advanced manufacturing automation through organizational analysis, planning, and development." Although this effort spanned several years, little benefit accrued.



The public relations firm hired by HumRRO redesigned the company's logo to incorporate a rhombus, which they deemed "forward looking."



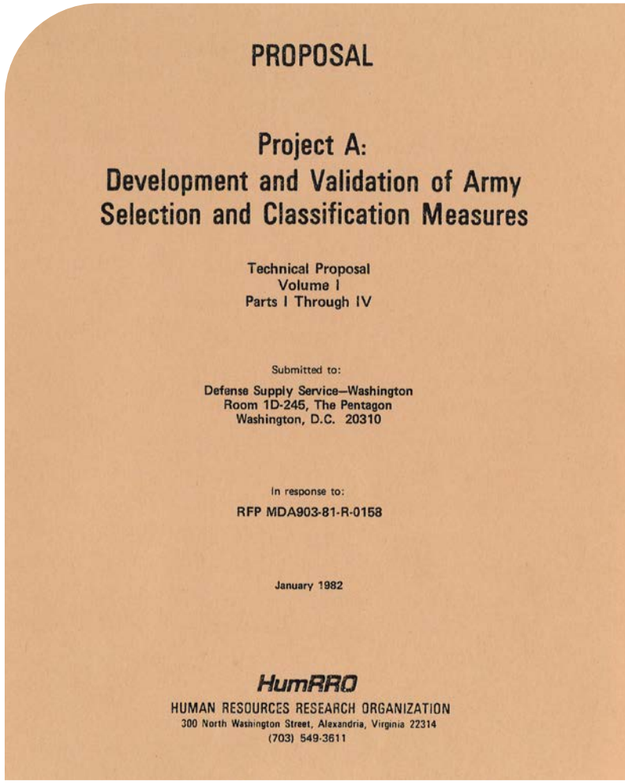
An artist's rendition of the 1100 building which was described in a local paper as having "mediocre design and unsympathetic materials."

Negotiations with the landlord for the 300 building broke down, and HumRRO began to look for a new home. In September of 1982, the organization signed a lease agreement that included a limited partnership and purchase option with the developer of a new office building to be constructed at 1100 South Washington Street. The vision was that HumRRO would move to acquire ownership of the building over the course of the 10-year lease. Negotiations with the landlord of the 300 building resulted in an agreement that allowed HumRRO to remain there until the new headquarters were completed. On August 13, 1983, bags were packed and the 13-block trip was made to the new site.

Despite the award of the ARI contract (**PROJECT A**), concerns remained about HumRRO's ability to thrive in a competitive environment. The organization's leadership made numerous attempts to address the issue, both before and after Project A. In 1981, they hired a senior level person as the vice president and director for program development. The major focus of this position was to assist HumRRO in developing new lines of business, or at least to expand the clientele for the old ones. After one year and little result, the position was eliminated.

In 1984, HumRRO hired a consulting firm to provide guidance on marketing. One of their first recommendations was that the letterhead and logo be redesigned. The new creation included a rhombus with the organization's name set at an angle. The consultants called it "forward looking;" the staff, for the most part, just didn't get it. Other suggested efforts included creating new marketing materials, such as a slide/tape show highlighting HumRRO's capabilities. Staff profiles were created, each of which included a picture of the employee and a one- to two-paragraph description of the individual's background and talents.

Another marketing effort that resulted from the consultant's suggestions was the convening of roundtables with individuals from business and industry to discuss trends in human resource management. The consultant saw the roundtables as a way of introducing HumRRO to a sector long sought after, but with whom little success had been achieved. At least one such event took place in Pittsburgh in 1985. Although it was deemed largely successful based on feedback from attendees, the lack of a clear mandate or audience for the sessions served as a deterrent to their ever becoming regular events.



PROPOSAL

Project A:
Development and Validation of Army Selection and Classification Measures

Technical Proposal
Volume I
Parts I Through IV

Submitted to:
Defense Supply Service—Washington
Room 1D-245, The Pentagon
Washington, D.C. 20310

In response to:
RFP MDA903-81-R-0158

January 1982

HumRRO
HUMAN RESOURCES RESEARCH ORGANIZATION
300 North Washington Street, Alexandria, Virginia 22314
(703) 549-3611

The Project A proposal was nearly 800 pages in length.



HumRRO management explored other avenues for increasing business. In April of 1984, the Board of Trustees approved the formation of an exploratory committee to investigate the possibility of establishing a wholly owned, for-profit subsidiary of HumRRO. The major reason for this was simple. More and more, federal government contracts were being classified as set-asides for small business, with the goal of providing smaller firms the opportunity to gain experience in arenas they would most likely be shut out of without a little edge. There were several definitions of "small business," based on such factors as number of employees or annual earnings. Under most of these, HumRRO would qualify. But there was a caveat: Nonprofits were prohibited from competing under the set-aside program.

In October of 1984, the Board of Trustees approved the articles of incorporation of HumRRO International, Inc., or HII. Monies were allotted for start-up activities, including the preparation of proposals. Initially, HumRRO employees would lend their services to the new firm, taking leave without pay from the parent organization while doing so. It took over a year, but in December of 1985 HII received its first contract to provide professional and technical resources in support of the Naval Post-Graduate School's personnel security research program. Perhaps its most significant procurement came about 2 years later when HII was awarded an indefinite quantities contract with the Office of Personnel Management for research and development in instructional technology, performance management, and workforce productivity. This single vehicle resulted in a huge increase in revenues for the new company, which ironically would be the beginning of the end of HII.

In 1985, another contract was signed that had more than its share of impact on HumRRO. Starting earlier in the decade, HumRRO staff began developing interactive videodisc courseware for the Army to deliver basic skills education (see *Training* on page 118). As one of the first applications of this technology in an educational setting, the work received a good deal of attention, particularly in the training community. One person who took note was a medical doctor/entrepreneur who suggested creating interactive video-based simulations of acute-care medical cases. Due to HumRRO's similar work with the Army, the firm became the choice provider for this product. For several years, HumRRO staff assisted in marketing efforts aimed at obtaining venture capital for the project. A major problem was the difficulty in conveying to individuals who were neither training nor medical professionals exactly what the software would do. Finally, the HumRRO Board of Trustees voted to advance the funds to create the pilot for the series in hopes that this would provide the impetus needed. The result was *Victor Mercedes, Gunshot Wound to the Abdomen*. The plan worked, and in March of 1985 **PROJECT HERMES** was born (see *Training* on page 118).

Over the next 8 months HumRRO hired new staff members to keep up with the intense demands of the design and production schedule. Among the new hires were some oddities for HumRRO, including a casting director, producer, director, and medical illustrator. Sales staff from the sponsoring company—Intelligent Images Inc., or I^3—were sent to the field with the new product, which generated much enthusiasm among the potential customer base. But there was a problem. Early in the search for funding, I^3 management accepted an offer from a hardware/software manufacturer to market the courseware exclusively on their machines for the first year. Although hospitals and teaching institutions could see their way clear to purchase the interactive programs, they were reluctant to spend sizeable amounts of money for a new computer system devoted solely to their presentation. It was a difficult sale and in November of 1985, the floor fell through when the start-up firm sponsoring HERMES stopped paying its bills and the capital venture money was gone. Management politely declined the request to continue work on the basis of promised future funding, and approximately 30 staff members who had been hired for the project were let go. Over the next several years, negotiations continued to resolve the debt owed HumRRO, but in the end there was no avoiding a major capital loss.

In 1986, HumRRO was approached by the other partners in the limited partnership that owned the headquarters building to see if there was interest in selling their interests in the property to a third party. After some discussion, management decided that the goal of eventually owning the building was unrealistic. Further, at a time of some financial uncertainty, the promise of an infusion of capital was difficult to turn down, and the deal was struck.

By the end of the decade, HumRRO's financial fortunes—which had ebbed and waned throughout—appeared grim. TEC continued to be a drain on resources, achieving minimal profits when not in deficit status. The HERMES loss, although still not definite, weighed heavily on the books. President Singleton did his best to paint a positive picture of the future, but the Board of Trustees had their doubts. In July of 1989, Singleton retired. He was immediately replaced by William Osborn, a longtime HumRRO employee who had recently retired as director of the Personnel Research Division.

Osborn, in conjunction with HumRRO Treasurer Jack McKay, set about reversing the fortunes of the firm. One of the first orders of business was to divest interest in TEC to stop at least one source of financial hemorrhaging. In March of 1990, the center was sold to the Technical Education Center, Inc. Around this same time, several members of the Board of Trustees also began to wonder about the desirability of maintaining HII. The firm's revenues had grown to a point where it qualified for few small business set-asides, which, after all, had been the reason it was created in the first place. Other cost-savings efforts were instituted and everyone—researchers, administrative staff, and managers—pulled together to ensure the future of HumRRO.









Assorted images from Project A, Korea, 1988. Field artillery hands-on test site (top right); Rodney McCloy (HumRRO) with field artillery scorers.

SELECTION AND CLASSIFICATION

FROM ITS EARLIEST DAYS, HumRRO personnel were involved in the search for ways to identify the right people for the right job. What are the characteristics that identify fighters versus non-fighters? Are there correlations between personal attributes and the behaviors exhibited while being held as a prisoner of war? What qualities, if any, are unique to those who perform successfully in leadership roles? Over the years, these questions had been asked and investigated, with the results contributing to the ongoing search for answers.

Over time, the military services have used a variety of measures to determine who gets in and who does not. As early as World War I, the Army administered the Alpha and Beta tests to informally assess individual strengths and weaknesses for the jobs that needed to be filled. These efforts were expanded and formalized in the ensuing years by each of the services until, in 1974, the Assistant Secretary of Defense (Manpower and Reserve Affairs) recommended that all services use a single test battery. This recommendation was subsequently approved by the Defense Manpower Policy Council which led to the development of the Armed Services Vocational Aptitude Battery (ASVAB). Following its implementation in 1976, much evidence was gathered showing that the ASVAB is a valid predictor of performance in training. What was lacking was a systematic assessment of the relationship between scores on the test and actual performance on the job. A congressional directive in 1981 mandated that the services fill this gap. With that, the Joint Service Job Performance Measurement/Enlistment Standards (JPM) project was initiated, with oversight provided by a Joint-Service Working Group and the Committee on the Performance of Military Personnel within the National Research Council. The Army's portion of this effort was overseen by the Army Research Institute for the Behavioral and Social Sciences and became known as **PROJECT A**. Although HumRRO personnel were involved in other projects during the 1980s that addressed selection and classification issues in both the military and civilian arenas, none could compare with Project A, either in terms of the technical contributions that resulted or the impact on the organization itself.

The basic goal of Project A was to provide the Army with the tools to ensure the best possible match between soldiers' abilities and the Army's needs. To do this, the HumRRO team evaluated the ASVAB's ability to predict success as a soldier and developed and evaluated an expanded enlisted personnel selection and classification test battery. These tests were validated against a full array of existing and newly developed soldier performance measures. Specifically, the project:

- Examined the relationship between existing selection measures (primarily the ASVAB) and existing and new Army-wide and job-specific performance measures;
- Developed additional new selection and classification measures and examined their value;
- Examined the relationship between early soldier performance (e.g., in-training measures) and later performance (e.g., job performance ratings and hands-on tests of job performance obtained at multiple points in time) so that more informed reassignment, reenlistment, and promotion decisions could be made; and
- Estimated the relative effectiveness of alternative selection and classification procedures in terms of their validity and utility for making operational selection and classification decisions.

An important distinction between this project and past efforts to establish the validity of the military's selection and classification process was the extremely comprehensive measurement of performance upon which this project

was based. Because of this focus, the results of this research were sure to stand up under operational as well as legal and scientific scrutiny. DoD needed to be able to guarantee that credible, valid, reliable, and fair measures were developed.

A large-scale validation of the ASVAB aptitude area composites used to select and classify enlisted personnel was completed early in Project A. As a result of this research, the Army implemented new ASVAB composites to select soldiers for all clerical and surveillance/communication jobs.

In addition, the HumRRO team developed and tried out new selection and performance measures which assessed a number of psychomotor, perceptual and cognitive abilities that were not measured by the ASVAB. The scope of the project made it possible to examine virtually the entire domain of information that might prove valuable to enlist soldiers, sample from that domain, and investigate the incremental value of each major piece of information. The performance measures that would serve as criteria to be predicted by the ASVAB and the new test battery included hands-on job sample tests, peer and supervisor ratings, paper-and-pencil job-knowledge measures, and training knowledge measures.

During June–November 1985, researchers performed a concurrent validation data collection. They administered criterion and predictor measures to approximately 600 soldiers in each of the 19 Military Occupation Specialties (MOS) under study, for a total sample size of approximately 9,500 soldiers. The sample chosen was of sufficient size to permit accuracy in assessment and the evaluation of possible race/gender differences. The data from this effort were used to determine the relationship among the predictor and criterion measures and to assess optimal methods for predicting a potential soldier's success in his/her first tour of enlistment. The prediction of early attrition or performance in training could not be examined with the data from this phase of the project due to the nature of the soldiers





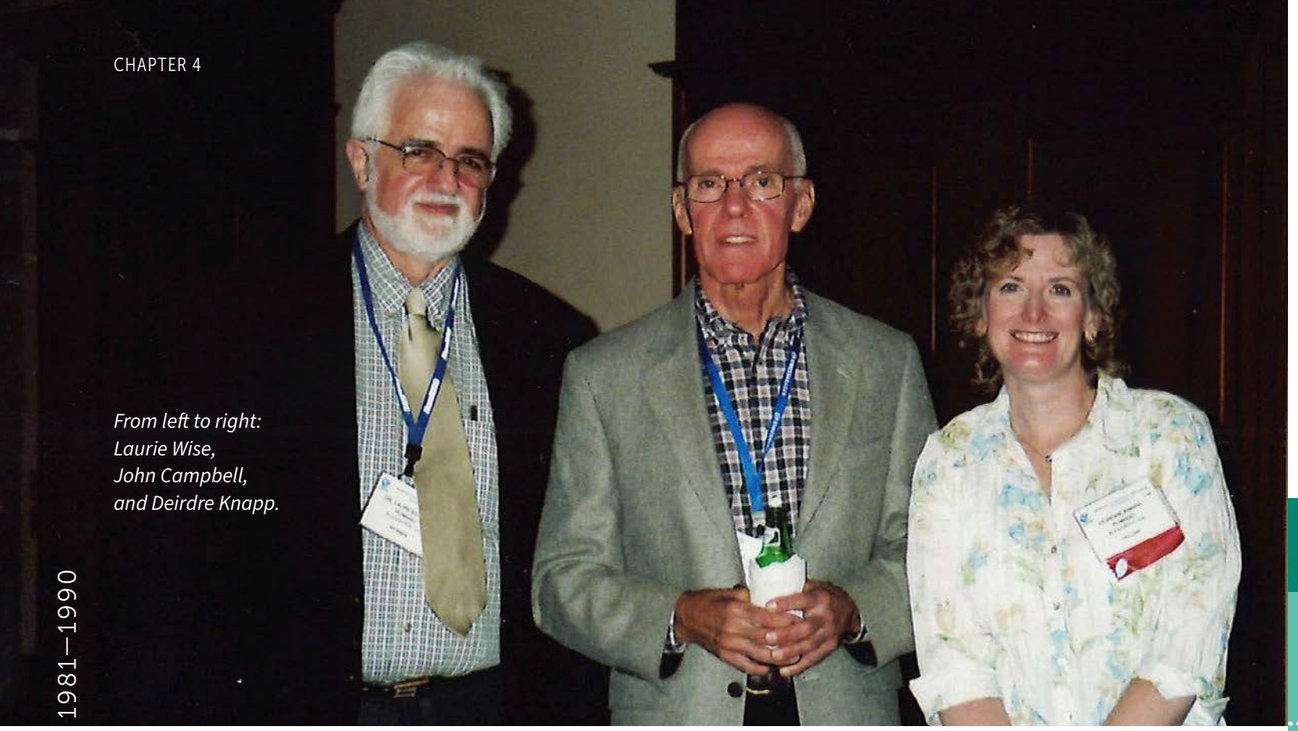




Left page:
Assorted images from Project A, Fort Lewis, 1985. Top to bottom: Roy Campbell with infantry scorers; Charlotte Campbell; Infantry test administration.

Right page:
Assorted images from Project A, Fort Polk, 1985. Top to bottom: Mike Rumsey (ARI), Dan Felker (AIR), with medics; Jack Doyle with signal scorers.



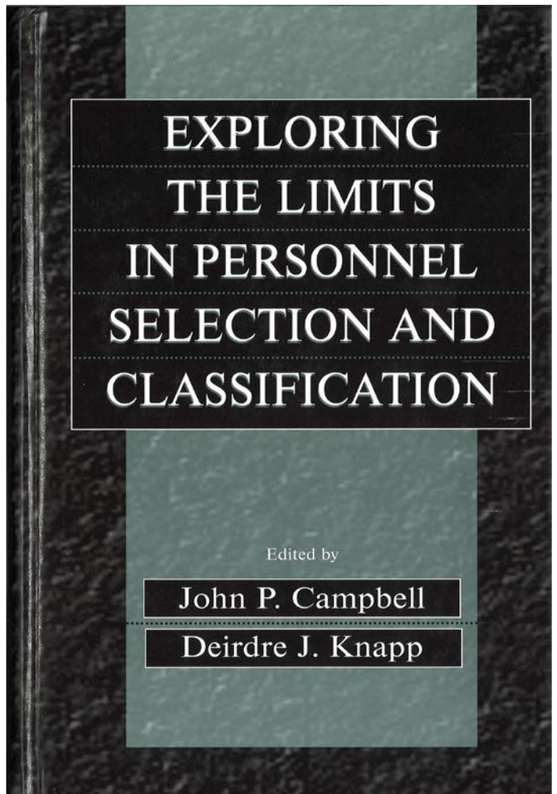


From left to right: Laurie Wise, John Campbell, and Deirdre Knapp.

in this sample (18–27 months active service). However, researchers were able to document the strength of the ASVAB as a predictor of job performance and recommend near-term adjustments to the structure of ASVAB composites and their use.

The final large data collection step of Project A was a longitudinal validation spanning the first two tours of soldiers' careers. The first data collection for this effort began in the summer of 1986 and the last concluded in 1992. In 1986-1987, researchers administered the refined selection and classification tests, now called the Experimental Predictor Battery, to soldiers immediately upon accession into the Army. The test timing was designed to allow the assessment of how well the new battery would predict training attrition and performance, as well as later on-the-job performance. This phase of the research included administering the predictor measures to more than 45,000 soldiers across 21 MOS as each entered the reception station and administering the end-of-training knowledge measures to 30,000 of these soldiers as each exited MOS-specific training. The effort continued with the administration of first-tour job performance measures to more than 10,000 of these same soldiers in their first tour, and second-tour performance measures to 1,500 of the soldiers who remained in the Army for a second tour. In this way, a complete picture was drawn of how a soldier's future success in the Army can be predicted by pre-enlistment tests (ASVAB and many of the experimental tests), performance during training, and performance in the first tour of duty.

In 1990, *Personnel Psychology* published a special issue entitled *Project A: The U.S. Army Selection and Classification Project*. This volume was acknowledged by the Academy of Management with a Scholarly Achievement Award, given to the publication judged to have made the most significant contribution to the field of Personnel/Human Resource Management that year. In addition, many journal articles, book chapters, and conference presentations reported findings derived from the Project A database. The most comprehensive description of the Project A research program is provided in *Exploring the Limits in Personnel Selection and Classification*, edited by John P. Campbell and Deirdre J. Knapp and published by LEA in 2001. Dr. Campbell, the principal scientist for Project A, summarized the contributions made by this work. Among the areas of impact he identified were occupational analysis, performance measurement, the study of individual differences, the estimation of classification efficiency, and the prediction of future performance from past performance. Campbell noted that, "The Project A database, the models of performance and performance determinants that were developed, and the measurement and data collection procedures used are all playing critical roles in virtually all current and proposed research efforts that are attempting to deal with this more dynamic [human resource management] environment."



HumRRO NOTABLES

JOHN P. CAMPBELL

Principal Scientist

JOHN CAMPBELL was raised in Westside, Iowa where his father ran a Ford dealership started by his grandfather. After graduating high school, John entered Iowa State University (ISU) to study engineering. In his junior year, he took a course in Industrial-Organizational (I-O) Psychology, for which he developed a passion that engineering did not ignite. He completed his Bachelor's degree at ISU and went on to earn a Master's in psychology. After graduation he moved on to the Ph.D. program in I-O at the University of Minnesota. He obtained his degree and joined the faculty of the University of California, Berkeley. Two years later, he was recruited back to Minnesota where he was a professor of psychology and industrial relations until his retirement as professor emeritus in 2016. Over his 50 years at Minnesota, he served as Director of Graduate Studies for over 40 years and chair of the I-O psychology program for more than 20 years. He was awarded the American Psychological Association's Distinguished Scientific Contributions award for the Application of Psychology, among many other honors.

The University of Minnesota's I-O psychology program is widely acknowledged to be one of the premier programs in the country, with many notable graduates. Over time, John recommended several of his outstanding students to HumRRO as either recipients of the organization's fellowship award or as future employees (or both). As of this writing, over a dozen of HumRRO's I-O research staff received their advanced degrees from the University of Minnesota.





As cited in the chapter covering the 1980s, the Army's portion of the Job Performance Measurement Project was a major undertaking and the largest federally funded behavioral science project awarded to that point. HumRRO and its subcontractors, the American Institutes for Research and the Personnel Decisions Research Institute, poured a tremendous amount of effort into the proposal. After the initial submission, ARI requested additional information and clarification on a number of issues. In the response, John Campbell was added to the list of personnel who would work on the project. He would serve as Principal Scientist and would devote 50 percent of his time to the effort over the course of the project.

Given its size and scope, it is fair to say that Project A was akin to a small corporation. There were six task leads managing various aspects of the work (e.g., database management and validation analyses, development of new predictors of job performance, measurement of training/Army-wide/MOS-specific performance). The entire effort was overseen by a Governance Advisory Group made up of scientific, general officer, and interservice advisors. Literally hundreds of individuals from the sponsoring organization and the participating contractors lent their efforts to the endeavor.

At the top of the organization chart were the HumRRO project director and John Campbell as Principal Scientist. In that role, he reviewed and applied his wisdom to all aspects of the work, from what to measure, to how to measure it, to how to analyze the resulting data. He also presented at numerous professional venues, including a notable paper titled "Project A: When the Textbook goes Operational." In his concluding chapter to the volume summarizing the work, *Exploring the Limits in Personnel Selection and Classification*, John wrote, "We began Project A with high respect for both our practice and our science. The respect for both and the appreciation for how they are so strongly interrelated were even greater at the end."

John's association with HumRRO lasted long beyond the completion of Project A. He served as an expert advisor for several projects that sprung from that landmark work aimed at identifying emerging job requirements and finding or developing measures that would predict successful military performance well into the future. He spent nearly 40 years contributing to HumRRO's strong technical reputation and overall success.

Dr. John Campbell died on July 19, 2025, at age 87.



EMPLOYEE AND ORGANIZATIONAL DEVELOPMENT

OVER THE COURSE OF THE EIGHTIES, HumRRO's client base continued to evolve, including an ever-increasing number of non-military organizations. As might be expected, new clients brought about new lines of work—or at least variations on old themes. One of the common links between these projects and their predecessors was the use of the systems approach to achieving client goals.

An ongoing issue in many organizations is identifying individuals who will perform well in supervisory or management roles. Typically, such positions require both job-specific knowledge and the ability to carry out leadership functions such as employee coaching and decision making. Far too often, people are moved into management based exclusively on their knowledge of the job without consideration for, or awareness of, their ability to lead. The Federal Aviation Administration (FAA) recognized this problem and instituted a strategic plan to guide the design, development, and implementation of a supervisory management training system. HumRRO provided support for this effort by assessing current training and comparing it to state-of-the art techniques identified through benchmarking. They then linked these development strategies to other training and career systems within FAA to ensure overall synergy within the agency. In a related project for the FAA, HumRRO provided support for the Senior Executive Service (SES) Candidate Development Program, or CDP. This program consisted of several nomination and screening steps, an in-depth developmental assessment and planning process, and follow-up monitoring activities. HumRRO worked with the SES staff to develop guidelines used by initial screening panels and wrote behavioral items for a candidate-rating instrument. These efforts contributed to the successful initial administration of the CDP, which then became a regular part of the FAA's executive screening process.



Pedro Aragão, CC BY-SA 3.0 GFDL, via Wikimedia Commons, 1987.



Photo released by Federal Aviation Administration (FAA), Public domain, via Wikimedia Commons.

A large-scale project for the Drug Enforcement Agency (DEA) involved the development of a content-valid promotion processes for senior Special Agents along with a career development program to help them prepare for advancement. HumRRO project staff conducted a job analysis and, based on the results, created job simulation exercises to be used in identifying candidates for promotion to both supervisory and management positions. These exercises included role-play, in-basket, oral presentation analysis, and written components. The HumRRO team conducted candidate orientation and assessor training sessions prior to implementing the program. The program was designed to facilitate career planning by pinpointing important job experience and training opportunities that would help agents develop the skills and abilities required for promotion.



A project conducted for the U. S. Army Civilian Personnel Center focused on first-line supervisors. In this case, HumRRO personnel collected data to identify the preferred personal characteristics and traits of civilian supervisors and the developmental methodologies that focus on those characteristics and traits. The research team undertook three data collections, including small group interviews with senior leaders, a large-scale survey of managers and upper-level supervisors, and focus groups with individuals identified as exceptional first-line supervisors.

Several projects in this period focused on performance testing used to assess the skills and abilities of employees. HumRRO developed a field test package to assess the job proficiency of first-term Navy Radiomen. This package included a hands-on test, a set of behaviorally anchored rating scales, and a paper-and-pencil simulation test. Researchers collected test data and evaluated the reliability and validity of job proficiency measures to establish whether the surrogates measured proficiency as effectively as the hands-on test. In another project for the Navy, HumRRO developed a paper-and-pencil surrogate test to replace a more costly and less efficient job sample test for Machinist Mates.

HumRRO undertook several organizational development efforts during this timeframe, including the creation of an organizational climate survey for a private-sector engineering firm. The instrument was created to address the central concerns of the firm's management, including organizational structure, supervision, work design, performance appraisal, and overall attitudes toward the firm. A similar effort was undertaken for the U.S. Department of Housing and Urban Development's Office of Housing. HumRRO researchers developed a survey instrument that addressed management's key concerns. The team then administered the survey to a sample of employees and reported back the results along with recommendations for change. Subsequent analyses of the data, conducted within subpopulations, allowed for more specific guidance to management. HumRRO personnel also developed a train-the-trainer program on Total Quality Management (TQM) for the Central American Institute for Industry, based in Guatemala. Two-day seminars were then conducted in each of five Central American countries to familiarize management personnel with the concepts and strategies of TQM.

Job-task analyses were carried out for a variety of clients and purposes in the 1980s. These positions included:

- The Army civilian Communications Career Program, the Quality and Reliability Assurance Career Program, and the Safety Management Career Program
- Officers in the Maryland State Police
- Foreign Service Officers in the Department of State
- Army civilian first line supervisors

A large-scale effort for the U.S. Air Force required the development of new methods of cognitive task analysis to study essential tasks within a large number of jobs. Working with subject matter experts, researchers identified the cognitive skills, knowledge, and strategies that constitute expert troubleshooting in those jobs. These analyses were to feed the development of assessment instruments—notably adaptive, problem-oriented troubleshooting tests—designed to measure the identified skills. The tests could then be used to investigate methods for training people in these skills. Such methods could include artificial intelligence training systems that contain simulated versions of the equipment that technicians must maintain, provide extensive practice on realistic problems, and be designed to focus on increasingly complex sets of skills.

Opposite page: Photo released to the public by U.S. Drug Enforcement Agency (DEA), via the National Archives Catalog. Image series compiled between 1982-2007.





MANPOWER STUDIES

MUCH OF HumRRO's WORK in the manpower arena during this period was driven by concerns within DoD over the ability to recruit qualified personnel. Estimates showed continuing decreases in the number of youth in the prime recruiting pool. For instance, it was projected that there would be 20% fewer individuals turning 18 in 1995 than there were in 1980. This decline, in combination with increases in college attendance and a highly competitive private-sector job environment, led military officials to investigate a variety of aspects of this potential problem. HumRRO conducted a series of studies that sought to determine the impact of accessing larger numbers of lower-aptitude youth as a means of addressing potential manpower shortages. The data that fueled this research came largely from Project 100,000 and the ASVAB misnorming, when significant numbers of low-aptitude men were brought in—or allowed in—to military service. The research focused on the performance of these individuals in comparison to subsets of those who were fully qualified for service at the time. Further, analyses sought to determine the impact of job complexity on the performance of men of varying aptitudes. One surprising result was that men of all aptitude levels seemed to have poorer outcomes when they were assigned to low-complexity occupations. The authors suggested that this may have been due to the possibility that the expectations youth brought to military service—whatever their aptitude—were not being met in jobs that lack interest and challenge.

Other attempts to identify the characteristics of youth who can successfully serve in the military included **PROJECT STANEVAL**. Among other things, researchers examined the moral standards for enlistment that were in effect at that time to determine their effectiveness. For this purpose, an Educational and Biographical Information Survey (EBIS) was developed and administered to 34,000 military applicants and 40,000 recent recruits. Analyses demonstrated a significant relationship between factors such as pre-service drug use, school suspension, and contacts with the law and subsequent premature separation from the military. These same data were used to examine the military attrition patterns of individuals with alternate high school credentials (e.g., the General Equivalency Diploma, or GED). The results of **PROJECT EBIS** suggested that persons with such credentials more closely matched non-high school graduates, who have traditionally been found more likely to leave service prior to completing their terms. This information was used directly in establishing future enlistment standards. Researchers examined medical standards for enlistment under **PROJECT MEDSTAN**. Their analysis showed the trade-offs that could be made in reducing physical standards on an exception basis to obtain personnel who might, in other respects, be above average in their qualifications for military service.

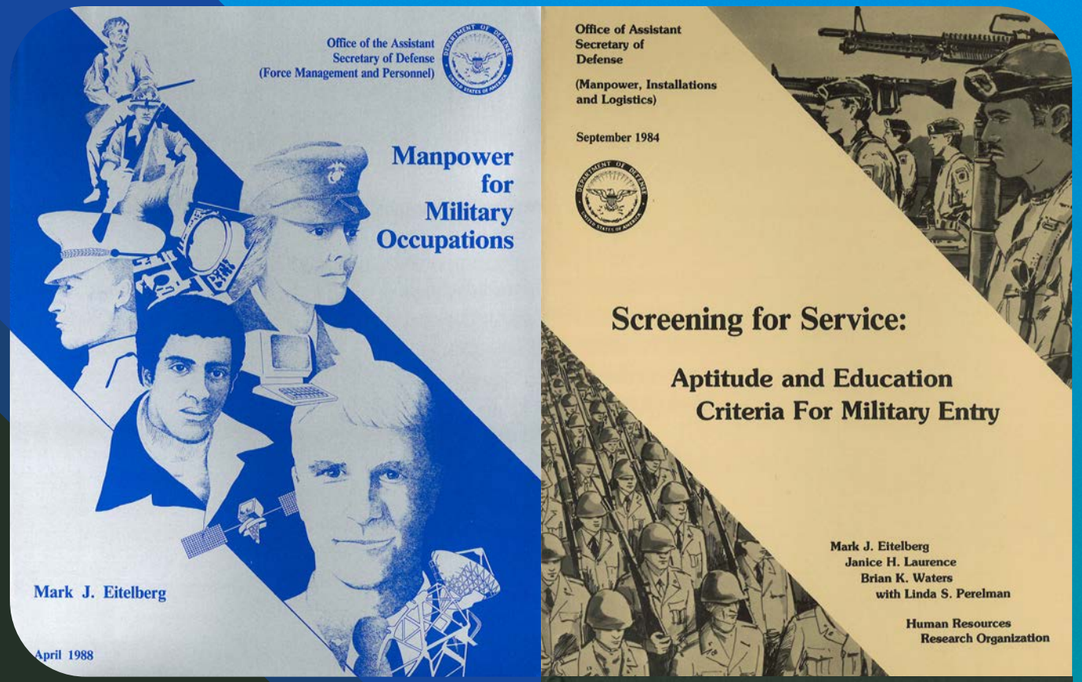
HumRRO played a significant role in the Profile of American Youth Study conducted in 1980, a major undertaking sponsored by the Departments of Defense and Labor. Researchers administered the ASVAB to a national probability sample of approximately 12,000 young men and women who were participants in the National Longitudinal Survey of Youth Labor Force Behavior. The sample was designed to be representative of the entire national population born between 1957 and 1964. This was the first time a vocational aptitude test had been administered to a sample of this scope, and the data were of great interest to a wide range of researchers. HumRRO personnel provided support in data analyses and report preparation through several contracts, including drawing comparisons of the 1980 youth population with the WWII reference group and military accessions with their civilian counterparts. One outcome of these efforts was the volume *Screening for Service Aptitude and Education Criteria for Military Entry*. The book explored, among other topics, subgroup and regional differences that emerged from the Profile data and examined the manpower implications of such differences for future cohorts.

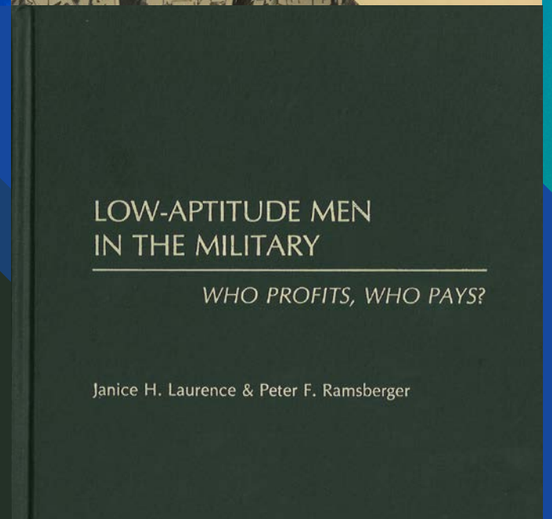
Top Left: Air Force recruiter explains the principles of aerodynamics using two model aircrafts, 1979.

Top Right: Air Force recruiter talks with a prospective airman, 1982.

Public release photos from the National Archives Catalog.

1981—1990





Two contracts during this period dealt primarily with personnel security issues. HumRRO personnel conducted a wide range of efforts for the Office of Naval Research:

- Using data from military sources, investigators explored the relationship between the type of security investigation a recruit underwent prior to enlisting and his/her subsequent in-service behavior. Some tentative conclusions were offered regarding the validity of each, along with suggestions for future research.
- A study of the adjudication process in the military services led to recommendations in such areas as adjudicator workload, information sources, and the decision-making process.
- A study of the relationship between entry standards for highly sensitive positions and performance criteria during military service suggested that improved methods of assigning new recruits to such positions were needed. Such methods should use a wider range of measures for predicting later performance, while accounting for manpower constraints.

Two additional studies focused on the adjudicator position. The first examined the training requirements for this job while the second involved conducting a task analysis of the position. Finally, HumRRO personnel contributed to the volume *Manpower for Military Occupations*—published by HumRRO—which addressed such topics as the effects of military enlistment standards on population subgroups and general trends in the assignment of subgroups to various military occupations.

One final study of interest to military manpower planners concerned the impact of military service on low-aptitude personnel. As mentioned previously, accessing larger numbers of lower-aptitude individuals was considered as a possible answer to the predicted recruiting difficulties. In addition, there were advocates for taking this step as a means of providing new opportunities for this group, many of whom came from disadvantaged backgrounds. Their thinking was in line with that expressed by Secretary of Defense Robert McNamara when he initiated **PROJECT 100,000** in 1966; military training and discipline would provide these men a leg up in society after their service was completed. The fact was, however, that the plethora of research focused on the men of Project 100,000 included little attention to what happened to them after they left the military. Correcting this deficiency was the goal of projects **RELY** and **VETLIFE**.

Samples of low-aptitude veterans from both the Project 100,000 and ASVAB misnorming periods were selected from military records. Researchers engaged in extensive tracing efforts, combing through files in the Personnel Records Center in St. Louis, MO. In the end, just over 300 veterans from each era were located. They participated in phone interviews in which they were asked about their post-service experiences, including education and employment history, income and financial status, and family status. Control groups of men of similar aptitude who never served in the military were drawn from the National Longitudinal Surveys of 1966 and 1979. The goal in selecting the control groups was to match them as closely as possible in terms of aptitude with the veterans. Both of these non-veteran groups were also contacted by phone to collect parallel information to that obtained from the veterans.

Subsequent analyses of these data showed few apparent positive outcomes from military service. Project 100,000 veterans were found to be somewhat worse off in regard to employment status, educational achievement, and income than were those who never served. Veterans from the misnorming era were no different from their civilian counterparts on such dimensions as employment status or income, however they had achieved less formal education, had higher divorce rates, and were more likely to be dissatisfied with their jobs. These results received media attention and were subsequently documented in a book entitled *Low-Aptitude Men in the Military: Who Profits, Who Pays?*

TRAINING

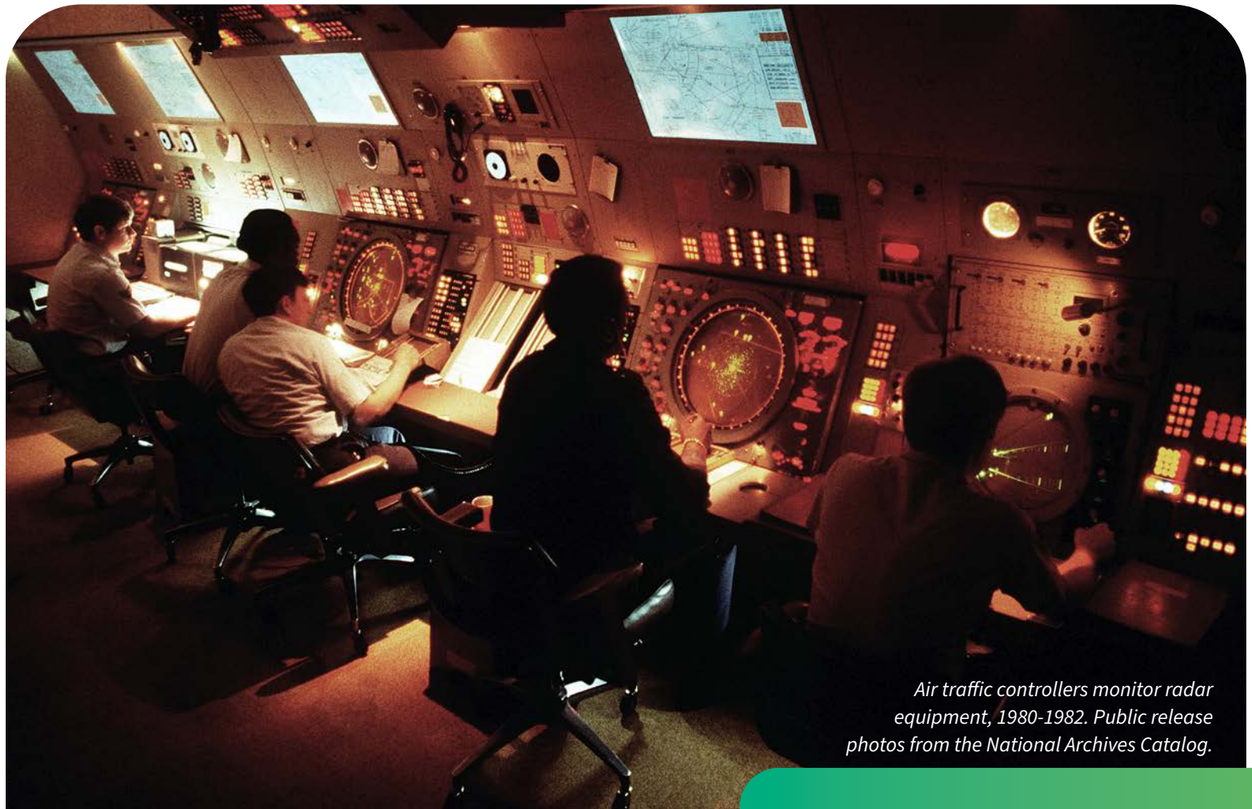
ALTHOUGH HumRRO's WORK DURING THIS PERIOD branched out in several new directions, training continued to be a major focus. As in previous years, this included basic research into issues surrounding the structure and delivery of training, as well as the actual development of instructional programs. In the latter category, the organization devoted a significant amount of work to the creation of interactive video programs for a wide variety of training needs.

Methods

One of the research interests of this period concerned the transfer and retention of skills learned in training. In **PROJECT AFSKILLS**, HumRRO personnel contributed to the study of skill retention by developing job-knowledge tests for four Air Force jobs. Each exam consisted of 200 multiple-choice questions covering job-relevant, wartime-critical tasks identified in conjunction with Air Force subject matter experts. A central component of the study was the standardization of test administration, which took place at nearly 100 sites. In addition, investigators collected task ratings on dimensions that were likely to affect skill retention. The researchers used these data to test a model that could address such issues as how frequently retraining is required in these specialties, and the timing of such training relative to when the skills would be used.

In **PROJECT PROJECT** (pronounced with a long "o"), HumRRO personnel designed and tested models of individual armor crewmember skill acquisition, performance, and retention. To accomplish this, they collected performance data on a variety of armor tasks from a sample of soldiers in training and another sample who had completed training one year prior to the research. The data were analyzed using the Systems Analysis of Integrated Networks of Tasks (SAINT) program. The results indicated that learning and retention could be predicted with some accuracy. However, researchers also found that there were differences in learning rates between task elements that could not be accounted for by the model.





Air traffic controllers monitor radar equipment, 1980-1982. Public release photos from the National Archives Catalog.

Another type of transfer was the focus in **PROJECT EDTECH**. Here, researchers addressed the potential for technology transfer between the military and civilian education/training arenas. The study resulted in a process model for estimating technology transfer potential. The model was then used to evaluate several promising methods being considered at the time (computer-based, videodisc, voice technology). The authors also provided suggestions for facilitating instructional technology transfer from military to civilian applications.

HumRRO staff were involved in several efforts sponsored by the Federal Aviation Administration (FAA) to evaluate and improve training process efforts. In one instance, they analyzed the training needed by air traffic controllers to derive recommendations for short- and long-term improvements to the training system in place at the time. Such recommendations included the proper application of advanced instructional technologies. The overall aim was to derive a system that would enhance controller performance while reducing training time and post-training attrition. The recommendations that resulted from this study formed the foundation for the FAA's *Flight Plan for Training*, a set of initiatives to improve employee development efforts within the agency.

The FAA also called upon HumRRO to assist in the implementation of transition training for air traffic controllers during the introduction of new en-route and in-terminal air traffic control equipment. The new equipment was part of a major effort to modernize air traffic control by introducing an advanced automation system. The contractors developing the new system were required to design transition training plans that would comply with FAA requirements. HumRRO personnel evaluated the extent of compliance and assessed the contractors' ability to address training needs effectively and efficiently. Further, researchers developed an ideal training approach guided by psychological principles and based on their extensive knowledge of the job. They compared the ideal training guidelines with the existing training plans to identify issues that needed to be addressed prior to implementation. Finally, HumRRO developed a road map for the redesign of air traffic control curricula. Their plan considered problems identified with the existing system, the impact of new equipment, and the feasibility of various training options.

Several projects from this era concerned training management:

- In **PROJECT SEMPER FI**, HumRRO staff developed a package for Marine Corps instructors on designing, developing, and managing individualized instruction and evaluation systems. As part of this work, a small segment of the curriculum at the Marine Corps Command and Staff College was converted to the individualized mode, and various export media for non-resident courses were tested.
- In **PROJECT KNCOC**, researchers evaluated the academic skill requirements for NCOs at each stage of their careers and compared them with the training methods in place at the time to meet those needs.
- HumRRO personnel developed a training management system for the Army Reserve Component that was tailored to their constraints and resources. The project included a "how-to-do-it" manual for training managers.

Several projects revolved around the Military Manpower Training Report (MMTR) and its associated data collection requirements:

- In **PROJECT MMTR**, HumRRO personnel documented the training-related data requests submitted to the Office of the Secretary of Defense over a 1-year period. Based on this analysis, they established and demonstrated an automated system for the processing of these data. The system was used in preparation of the MMTR over a period of several years.
- Similarly, in **PROJECT AFMC**, Air Force, Marine Corps, and Navy systems for collecting and reporting training loads and associated data were revised. In support of this effort, researchers compiled a handbook of MMTR procedures that outlined the processes, flow, data, and policies related to the production of the report.

Training Development

The training development efforts conducted by HumRRO personnel over this period covered a wide range of target audiences and subject areas. For instance, after the failure of the space shuttle Challenger, a Management Study Group within the National Aeronautics and Space Administration (NASA) conducted a review and recommended that there be formal training and development programs for program and project managers in the agency. They determined that the demands of these roles were becoming increasingly complex, and that most of the persons in these positions were scientists who had been promoted into management without receiving adequate training. In two separate efforts, HumRRO analyzed requirements associated with project and program manager tasks and developed seminars covering such topics as planning, scheduling, budget formulation/monitoring, ethics, and advocacy. HumRRO developed case study materials to support the training, along with a computer-based instructional package on the NASA Work Breakdown Structure used to control program functions.

HumRRO personnel in Heidelberg, Germany, developed several training packages to support the adaptation and functioning of U.S. Army troops stationed in that country. The first of these was a 40-hour German language and culture course created for the Army Continuing Education System. This course was mandatory for all newly arrived enlisted soldiers through the rank of Sergeant. It covered situations and language functions most needed by soldiers in their early adjustment to living in Germany. The development efforts were guided by principles of second language acquisition, including functional/notional curricula, communicative competence, and cultural sensitization. The instructional media included study/teacher guides, slide-tape programs, and audiotapes.

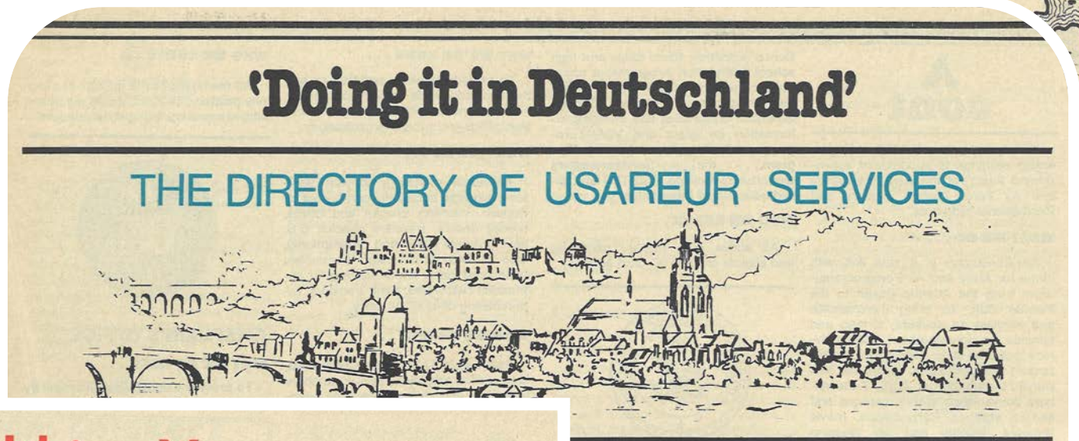
In a related effort, researchers studied the on-the-job communications needs of soldiers as they worked with their German counterparts. The needs assessment was carried out through observation, interviews, surveys, and content analysis of printed documents. HumRRO developed a series of job-specific German language courses using state-of-the-art language training methods. The Heidelberg group also developed a life coping skills course for soldiers and their families stationed in Germany. Called "Doing it in Deutschland," the course covered such topics as using public transportation, eating out, shopping on the economy, and legal aspects of living in the country. Two delivery systems were used:

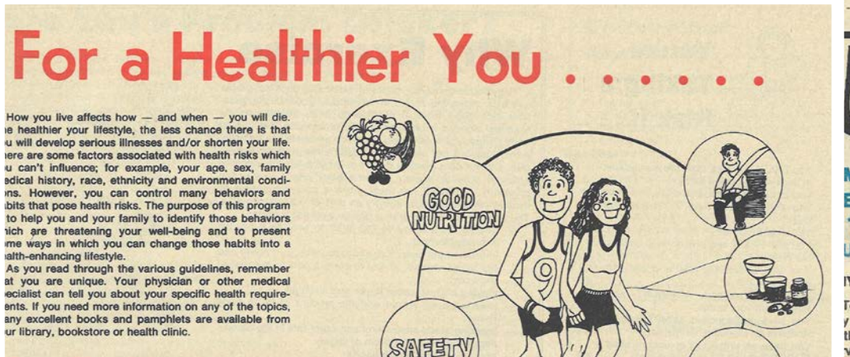
(a) Modules were published in the *Stars and Stripes* newspaper and supported by the Armed Forces Radio Network; and

(b) The courses were delivered through local Army education centers.

A multifaceted evaluation indicated that the programs were very positively received. Given their popularity, the materials were revised and implemented again approximately 2 years after the first administration.









Excerpts from the Stars and Stripes newspaper and a published 'Doing it in Deutschland' module.



Air Force recruiter discusses aptitude testing with two students and their counselor, 1982. Public release photos from the National Archives Catalog.

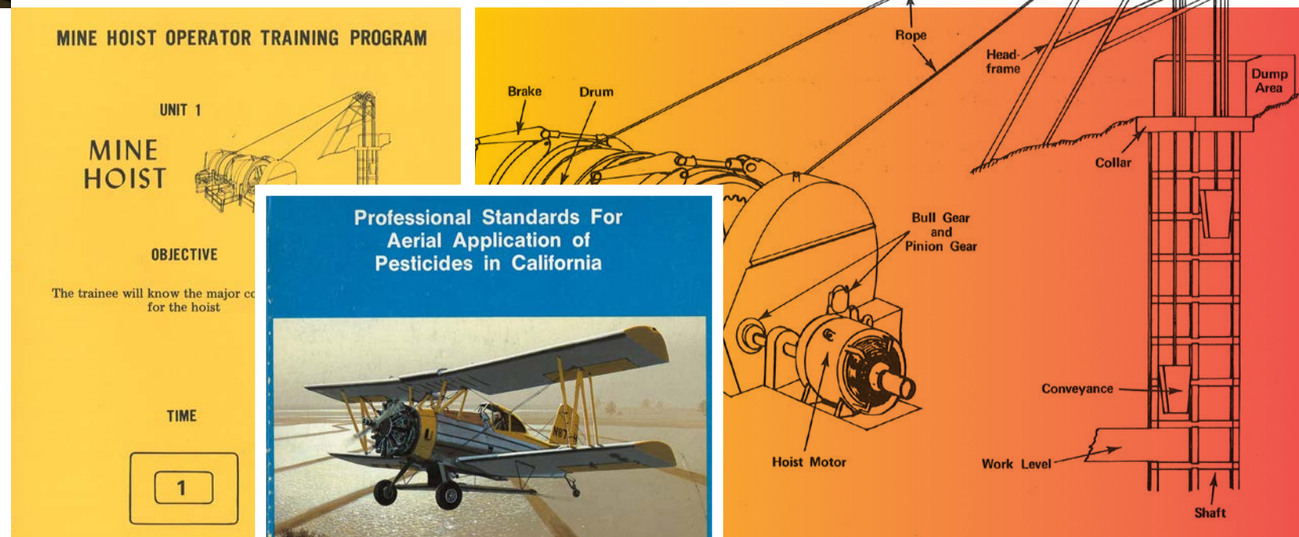
HumRRO personnel conducted a large-scale training effort for the Department of Defense Student Testing Program (STP), now known as the Career Exploration Program (CEP). Through the CEP, the ASVAB is made available to high schools across the country free of charge for use as a counseling tool. The results help students assess their aptitudes, predict training performance in academic and occupational endeavors, and select career exploration activities. A new version of the assessment became available in the 1984–1985 school year. A crucial element for the successful implementation of the STP is the availability of counselors who are trained in assisting students in interpreting their results. Therefore, HumRRO personnel developed instructional materials for counselors in both stand-up and self-paced delivery modes. The training was delivered to a Core Group of 12 counselors over a 2-day period. They, in turn, trained 60 counselors each in 1-day workshops held across the country. The self-instructional materials were used by school personnel who could not attend the seminars. Evaluation efforts included pre- and post-session learning and feedback instruments, evaluator reviews, counselor impact surveys, and school visits. The results were uniformly positive, indicating that the training was an integral part of the program's overall success.

Several projects were carried out by HumRRO staff at Fort Knox regarding the training of Army armor personnel. **PROJECT BNCOC** applied a systems approach to the training of tank commanders. Development of the system included identifying training needs and priorities and creating a course outline and two unique training packages. The first of these identified applicable nonprocedural tasks (e.g., problem solving), cross-walked them with procedural elements, and then integrated the nonprocedural information into training exercises. The second package included two training exercises: the single tank tactical exercise and the intra-platoon tactical exercise. HumRRO personnel were also involved in several armor training related research and development efforts. Topics included:

- Reading, ability, and multiple-choice testing,
- Methods for improving soldiers' manuals,
- Development of driving tests for M1 tank drivers,
- Practice guides for howitzer crews, and
- Development of flash cards for vehicle identification.

HumRRO developed non-military training for a wide range of audiences on a variety of topics during this period. Some examples include:

- A safety training program for managers of coal mines
- A desk guide for FAA personnel recruiters that identified, among other things, methods and tools for finding potential applicants
- Linguistic proficiency improvement courses for nonresident language curricula in Russian, Polish, and Czech that depended heavily on authentic source materials (e.g., newspapers, books)
- A training curriculum for personnel in the pesticide application industry regarding safe and proper use of pesticides
- A program for Alabama Power Company personnel on the application of the systems approach to training



Simulations

HumRRO personnel participated in several projects aimed at incorporating computer-based technologies into simulations for training purposes. **PROJECT SIMCOMM** developed a prototype computer-driven speech synthesis simulator with automated message generation and delivery. Working with a large computer hardware/software firm, HumRRO personnel assisted in the development of a linguistic database and derived the technological and functional requirements for the system. The outcomes were used to develop instruction in command, communication, and control skills for platoon-level leaders. The system included six networked computers—four for trainees, one for opposing forces, and one for the exercise controller. Videodisc images, graphics, and speech synthesis/voice recognition were used to present the cues to action as trainees controlled tank movement and firing. The exercises developed were used as a bridge between classroom instruction and field training.

In **PROJECT DELCO** the focus was low-cost tactical training for small-unit combat leaders, with an emphasis on tactical problem solving and decision-making skills. HumRRO developed two prototype modules, including audiovisual presentations, tactical scenarios, interactive workbooks, and scoring procedures.

Another focus of HumRRO's simulation work during this period was the development of methods by which training devices could be selected and employed. As more and more of these devices became available, the need for methods to identify which were appropriate for a given training purpose became clear. In **PROJECT SKILBASE** HumRRO personnel developed new models to address the cost-effectiveness of training devices focused on skill training. The models identified the skills required for job performance and specific strategies for teaching those skills and evaluated efficient use of skill-based training devices. HumRRO developed a model framework for training system optimization under **PROJECT OPT,** which included a diverse set of analytic tools to address such questions as whether or not to use a simulator, the appropriate training media, and optimal fidelity levels. The result was a model for Optimization of Simulator-Based Training Systems (OSBATS).

Computer-Based Instruction

HumRRO continued its work in the area of computer literacy education through projects with the National Science Foundation (NSF) and the Educational Testing Service (ETS). For the NSF, the research team developed, tested, and evaluated computer literacy curriculum guides and had them packaged and delivered to school personnel. The resulting book, *My Students Use Computers*, provided objectives and activities for various grade levels. Step-by-step instructions allowed teachers to integrate computer-learning tools into their current curricula. The information provided was general enough to allow for a wide range of system configurations, from handheld calculators to personal computers to large time-sharing systems. The Educational Testing Service called on HumRRO's extensive experience in computer literacy to provide a national definition of the term as it applies to school system superintendents, principals, teachers, and students. Working with a panel of nationally recognized experts in the field, researchers derived definitions of computer literacy that were used as the basis for surveys to assess the status of the nation's schools on this dimension. The results were used by policy makers for purposes of curriculum and resource planning, as well as training.

HumRRO personnel were also active in the corporate environment. A project conducted for a large hardware/software development firm focused on their internal education needs and what those needs were likely to be in the year 2000. Members of the firm's Corporate Education Group recognized that jobs within the company were becoming more challenging. The growing complexity of the workplace, in combination with a promote-from-within policy,

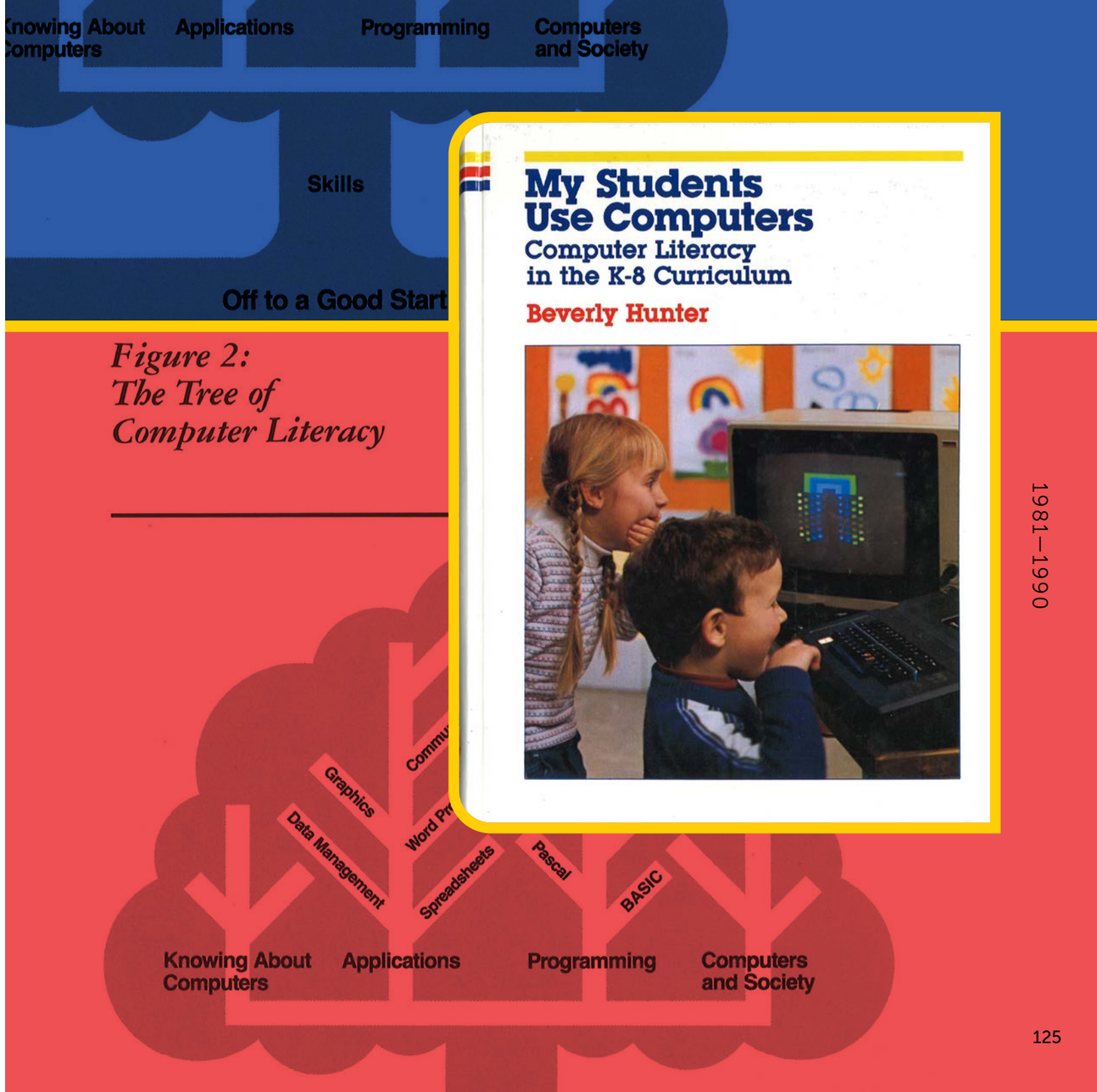


Figure 2: The Tree of Computer Literacy



was likely to place greater strains on the internal education mechanisms. HumRRO identified the parameters of that system, including recommendations for meeting the development needs of the employee of the future. In conjunction with this same client, HumRRO produced a *Guide to Learning*, which described the importance of computer literacy and identified the major categories of skills and knowledge needed to purchase and use personal computers. This volume included an annotated bibliography of resources available to computer users at that time (1984).

A large, multinational corporation sought HumRRO's assistance in developing computer literacy workshops for their internal curriculum developers. These individuals were highly experienced training professionals, who, at the time, had little background in developing computer-based materials. HumRRO conducted two initial workshops for developers and managers before handing off the materials to in-house personnel. Finally, HumRRO staff helped create user's manuals for several emerging word processing systems. Typically, the manuals included modularized, self-paced materials developed with an emphasis on accessibility by users with a wide range of computer familiarity.

Part of the training efforts for the modernized air traffic control equipment under development for the FAA was to include Computer-Based Instruction (CBI) delivered by the Advanced Automation Training System. A prerequisite for their efforts included guidelines for the development of CBI to ensure a uniformly high standard of quality. HumRRO personnel developed these guidelines in a *CBI Designer's Handbook*, which prescribed the procedures for designing, developing, and evaluating computer-based courseware. The Washington chapter of the National Society for Performance and Instruction recognized this volume as an outstanding instructional product for 1990. In another study for the FAA, HumRRO personnel, working with the Interagency Group for Computer-based Training, sought to identify the barriers to the implementation of CBI in federal agencies. The primary shortcomings identified in the study were a lack of regulation that dealt specifically with the use of computers in training and an extended procurement time that lagged behind technological advances.

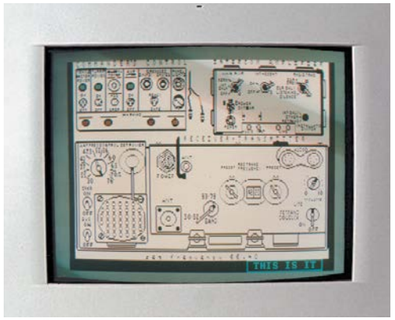
HumRRO's major computer-based training development efforts during this period used the emerging technology of interactive videodisc. Through a contract with the Army Research Institute and the Defense Advanced Research Projects Agency, HumRRO was at the forefront of applying this technology in the educational and training arenas. The genesis of this work was partly an unnoticed mistake in developing norms for the new version of the ASVAB in the mid-1970s. As described above, the result of this error was the admission to the military of thousands of men who were thought to be of higher aptitude than they actually were. Attention to this problem came gradually, as training personnel and commanders in the field realized they were having greater difficulty "getting through" to the troops. One result was a renewed emphasis on the development of training materials and methods that could communicate with men from a wide range of aptitude levels. Interactive TV seemed like a perfect choice.

The primary HumRRO project, called **DISCO**, evaluated the Spatial Data Management System (SDMS) as a tool for basic skills education. The SDMS included several components: a CPU, two monitors (one for navigation and selection purposes, the other for playing video), and a box with a joystick and four buttons. A typical program would include an instructional piece presented through video, followed by a series of exercises that challenged the user to apply the information just presented. Topics covered included study- and test-taking skills, problem solving, and land navigation. In the navigation section, extensive use was made of another feature of SDMS, namely surrogate travel. This technique, developed by the Interactive Television Company, involved taking a series of still pictures along a given path at set intervals, either walking or driving. When these were played back through the SDMS software, they gave the feeling of movement in real time. HumRRO

designed a series of exercises that involved the use of navigation skills (e.g., determining direction through the position of the sun) to reach a goal. Research demonstrated this to be a highly motivational and effective instructional medium. In a field test, educational specialists at a major Army base reported that the problem wasn't getting soldiers on the system, it was getting them to stop using it when it was time for the education center to close.

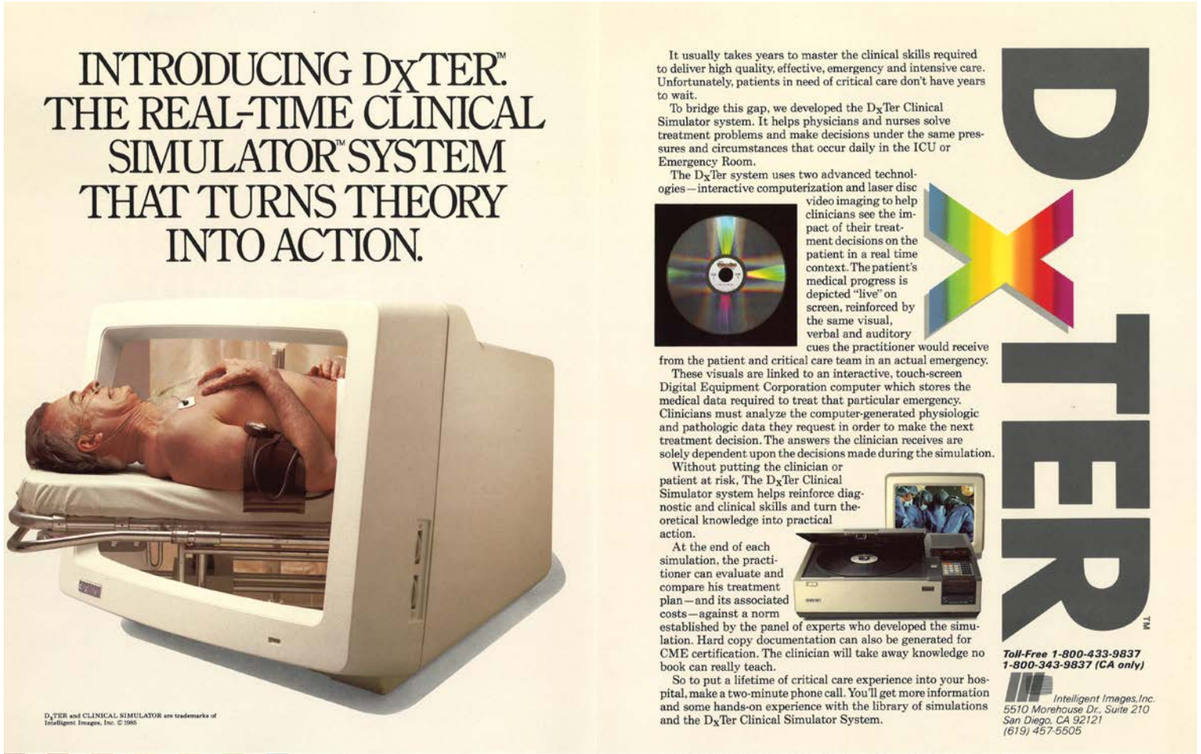
The work for the Army led directly to a major project undertaken for the private startup firm, Intelligent Images Inc. (I^3). HumRRO developed video-based simulations of actual trauma care cases. Under a typical scenario, the case would begin with video showing the patient's arrival at the trauma center, where paramedics or other medical personnel on the scene provided information concerning his or her immediate condition. From that point, it was up to the user to order the necessary diagnostics to determine the nature of the patient's problem and enact a course of treatment. Approximately 300 choices were available at any time, including X-rays, tests, fluids, and drugs. Results were returned in "real time," and video updates were given when indicated by changes in the patient's condition. Each disc contained a discussion of the case that was tailored to the treatment provided by the user. There were also one or more lessons dealing with topics of particular importance in the simulation. In one example, a case involving a motor vehicle accident victim included a lesson on chest tube placement and monitoring. Discs from the **HERMES** series won several awards, including the 1985 Nebraska Interactive Videodisc Award for Best Educational Achievement, a Gold Medal at the 1986 John Muir Medical Film Festival, and the First Lesher Communications Award for "the best and most innovative communication" in medicine. Another tribute of sorts came on January 13, 1988 when segments of several of the HERMES programs were featured on the NBC drama *St. Elsewhere*. One of the subplots of the episode, entitled *Heaven's Skate*, centered on several of the doctors as they

Navigation skill screens from Project DISCO.









sought to become certified by managing the trauma care cases—with varying degrees of success.

The HERMES work led to several projects with the Navy Health Sciences Education and Training Command. The focus of much of this work was on the position of Independent Duty Corpsman (IDCs). These individuals are trained in the basics of health care, such that they are able to handle the routine problems that arise on the ships on which they serve. The Navy decided that interactive videodisc would be an effective means of providing both initial and refresher training to IDCs in a variety of areas. This led to the Computer-Assisted Medical Interactive Video System, or CAMIS. HumRRO personnel developed several programs for this system, including *Clinical Application of Laboratory Procedures, Dental Emergencies*, and *Treatment of Respiratory Conditions*. Two other videodisc projects for the Navy dealt with *Basic Skills Remediation for Hospital Corpsmen*, and *Oral Examination Assisting*.

Not all of HumRRO's videodisc work was in the medical field. A project for the Defense Language Institute (DLI) required the development of interactive courseware to support resident Greek and Turkish basic courses. HumRRO personnel formulated the design for each program, which was then made a reality by consultants fluent in the two languages. Obtaining the needed video footage involved five months of taping in Greece and Turkey. In a similar effort, HumRRO responded to DLI's need for culturally authentic Spanish language video by planning and overseeing five months of taping in Costa Rica. Finally, working as a subcontractor, HumRRO personnel took primary responsibility for the design and development of 40 hours of videodisc-based instruction for Burlington Northern Railroad train dispatchers. The subject was the General Code of Operating Rules, and the course included explanations of the rationale behind the rules, demonstrations of their impact, exercises that required their application, and extensive simulations that closely mimicked what dispatchers actually do on the job. Both the Burlington Northern and DLI programs received awards of excellence.

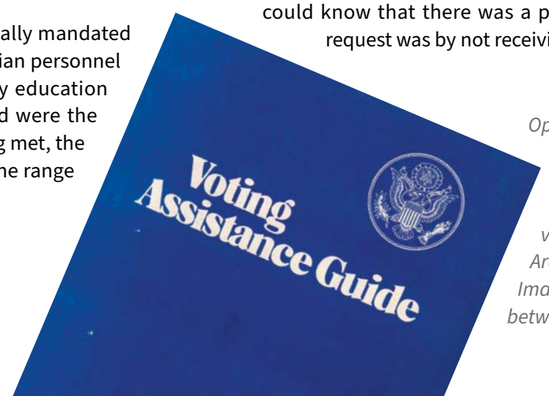
PROGRAM EVALUATION

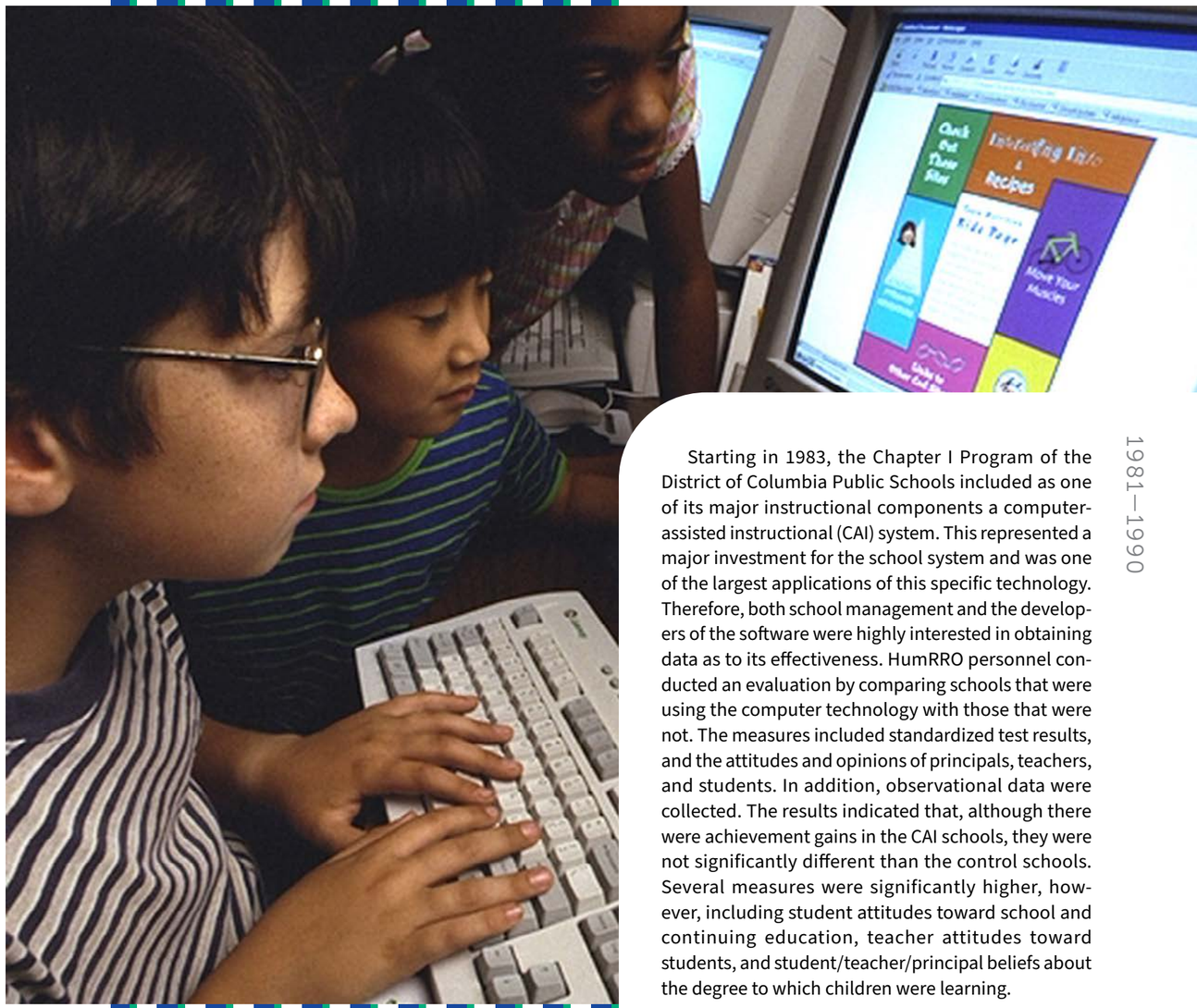
HumRRO CONDUCTED SEVERAL PROJECTS during this period that were aimed at evaluating aspects of the DoD-sponsored High School Testing Program/Career Exploration Program. The focus of **PROJECT SCHOOLMARK** was on the marketing of the program. Specifically, researchers examined the performance of civilian test specialists as marketers for the program as compared to military recruiters. The results favored the civilians, which led to the implementation of 81 test specialists' positions across the United States. In **PROJECT INTERP**, researchers conducted surveys to determine how schools use the ASVAB, how counselors interpret the results, and if and how students use their results for career exploration. The results of the surveys led to recommendations for improving various aspects of the program.

DoD, in coordination with the National Occupational Information Coordinating Committee, funded 14 state projects to incorporate military occupation and training information into Career Information Delivery Systems (CIDS). HumRRO was hired to evaluate these efforts by documenting the integration of the military information into the CIDS and assessing the degree to which this information was disseminated and used. Surveys and site visits were conducted for this purpose, with the results used to make recommendations for program improvements.

HumRRO conducted a congressionally mandated study of the needs of military and civilian personnel overseas for voluntary postsecondary education services. Among the issues addressed were the degree to which such needs were being met, the level of services to remote sites, and the range of education choices available. Three research teams were sent to the field and visited eight European sites, 15 Pacific installations, and two bases in the continental United States. The teams gathered data from higher education institutions represented overseas, installation education centers, and education-services management heads within two Commands. A panel of well-known educators reviewed the researchers' five sets of conclusions and recommendations before the final report was submitted to DoD and Congress.

The Federal Voting Assistance Program was created within DoD to provide citizens around the world information to allow them to exercise their franchise when stationed away from their home district. In creating the program, Congress mandated that evaluation efforts be undertaken with each national election. In 1980, HumRRO personnel conducted four surveys to meet this requirement. These included military members and federally employed civilians overseas, privately employed citizens living abroad, military personnel responsible for the dissemination of voting information, and local voting officials. Several problems were identified through this process. One of the major recommendations implemented based on the results was the inclusion of a return receipt that voting officials could use to notify voters that their absentee ballot application had been received and approved. The return receipt was a response to the finding that under the existing system, the only way individuals could know that there was a problem with their request was by not receiving a ballot.



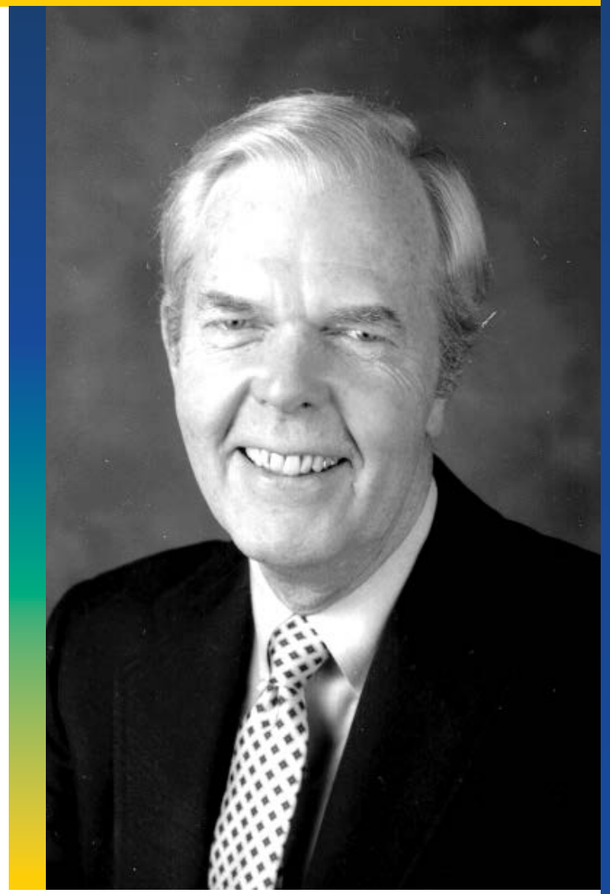


Opposite page: Students using instructional computer program, via the National Archives Catalog. Image series compiled between 1969-2005.

Starting in 1983, the Chapter I Program of the District of Columbia Public Schools included as one of its major instructional components a computer-assisted instructional (CAI) system. This represented a major investment for the school system and was one of the largest applications of this specific technology. Therefore, both school management and the developers of the software were highly interested in obtaining data as to its effectiveness. HumRRO personnel conducted an evaluation by comparing schools that were using the computer technology with those that were not. The measures included standardized test results, and the attitudes and opinions of principals, teachers, and students. In addition, observational data were collected. The results indicated that, although there were achievement gains in the CAI schools, they were not significantly different than the control schools. Several measures were significantly higher, however, including student attitudes toward school and continuing education, teacher attitudes toward students, and student/teacher/principal beliefs about the degree to which children were learning.

HumRRO PRESIDENTS

JAMES W. "JIM" SINGLETON



JIM SINGLETON received a B.A. in sociology from Oberlin College, followed by master's and doctorate degrees in the same field from the University of Chicago. He served for one year as an assistant professor and head of the Sociology and Anthropology department at Wilson College in Chambersburg, Pennsylvania. Subsequent positions included being a project director at Science Research Associates and a department assistant at Northern Trust Company, both in Chicago.

In his next position, with Systems Development Corporation, Singleton served as Vice President and Manager of Washington operations. There, he was involved in the design and development of applications software for several early computer-assisted military command and control systems. He also served as a member of the psychology panel of the United States Air Force Scientific Advisory Board.

Singleton then served for a year as president of Doxiadis-System Development Corporation where he was responsible for establishing corporate policy and overseeing client relationships. The firm specialized in urban planning through computer applications. He then moved on to Ocean Data Systems, Inc. where he was a Vice President and member of the technical staff, planning and developing projects in a variety of fields, including insurance, railroads, and retail merchandising. After 6 years he became the associate manager of the firm's Technology Systems Group in Monterey, California. This work involved developing advanced computer applications for a diverse set of clients, including the American Association of Railroads, the Department of Health, Education, and Welfare, and the government of Iran.



Based on available documentation, it appears that a HumRRO presidential search committee was initiated prior to Bill McClelland's entering the hospital for heart surgery, from which he never recovered. In a letter to board member William Biel written shortly before his death, McClelland expressed the sentiments of the corporate management group that it would be advisable to hire an executive search firm to assist the internal group assembled for this purpose. A motion to this effect was made at the May 1979 Board of Trustees meeting and passed unanimously. However, shortly after that the chairman of the board, William Bevan, then provost at Duke University, sent a letter to the other board members expressing his dismay at this turn of events. "Since the Board empowered but did not instruct me to employ a 'head-hunting' firm, I must make clear that I have no intention of exercising that prerogative except as a course of last resort."

In all, 10 candidates were interviewed, with four becoming finalists for the role. In the end, the Board voted to appoint Singleton as HumRRO President, and he assumed the position on August 1, 1979.

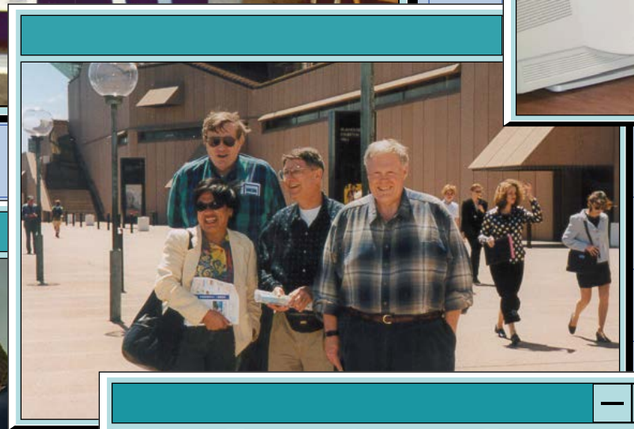
As is documented in the following chapters, Singleton's 10-year tenure at HumRRO was marked by continued financial strains and a variety of entrepreneurial attempts to deal with those strains. Unfortunately, several of those ventures presented additional challenges rather than solutions. In retrospect it seems clear that his biggest contribution to HumRRO was in taking the lead to form the team that successfully competed for Project A. This work came at a much-needed time for the company, and the high visibility of the effort began paving the path to better days.

















HumRRO
THROUGH
THE DECADES

CHAPTER 5.

1991–2000

FROM UNCERTAINTY TO STABILITY

AS THE 1990s BEGAN, the financial problems faced by HumRRO continued. Although the Technical Education Center (TEC) had been sold, it continued to struggle to stay afloat and therefore had difficulty maintaining the agreed-to payment schedule. In addition, there remained liabilities incurred by the center when it was still under HumRRO's aegis. The medical videodisc sponsor reemerged under a revamped name and corporate structure but was still unable to generate profits that would enable HumRRO to recoup much of its losses. Such concerns eventually led HumRRO's long-term financial institution to withdraw the line of credit that allowed the firm to pay salaries and other expenses in the interval between billing clients and receiving payment. In January of 1991, HumRRO signed a 1-year financing agreement with an asset-based lending institution. During this period substantial legal expenses associated with TEC and with the need to find a new lender were incurred.





A lunchtime meeting at the Canal Center Plaza office, 1999.

The organization instituted cost-cutting measures that reduced the overhead rates by one-third: reimbursable expenses were cut to the bone. Fiscal Year 1991 was HumRRO's first full year of operation without TEC; it was also the first time in four years that the organization ended up in the black. In an effort to clear the potentially valueless TEC note, HumRRO sold it back to its new owners for a reduced amount. By the terms of the agreement HumRRO was released from liability on the leases for TEC's space and equipment that had not been successfully transferred at the time of the sale.

Another issue of some concern at this time was the location of HumRRO headquarters. Under conditions of the existing lease, the firm was paying a much higher rate for space in the 1100 South Washington Street building than was available on the at-the-time depressed real estate market. HumRRO's president and treasurer undertook extensive negotiations with the owner of the property to address this condition but could not arrive at a solution. Management began to search for new quarters and reached a very favorable lease arrangement with the owners of Trans Potomac Canal Center. In February 1992, HumRRO once again packed its bags and made the 20-block move to Old Town North. This, too, became a protracted affair with many months of negotiations devoted to resolving the dispute between the company and its former landlord.

By 1993, things began to turn around for HumRRO. Management established a satisfactory lending relationship with a different bank and reached a settlement with the owners of the 1100 building. Non-defense clients were offsetting reductions in military contracts that had led to lower-than-expected revenues in the previous year. By the end of the fiscal year, HumRRO saw its best surplus in years, allowing small bonuses to the staff that had worked so hard to achieve this reversal in fortunes.

With the gradual erasure of the gloom and doom, HumRRO's president, Bill Osborn, began to think about retiring yet again. Under agreement with the board of trustees, Osborn gave 4-months' notice of his intentions, and a search committee was created to look for a replacement. On June 30, 1994, Osborn left the position and was replaced on an interim basis by Vice President Robert Sadacca. The search committee, made up of corporate officers and a cross-section of employees, interviewed several candidates for the job before selecting Lauress Wise, chief of the Personnel Testing Division of the Defense Manpower Data Center (DMDC). Having worked for some 16 years at the American Institutes for Research prior to his time at DMDC, Wise was familiar with HumRRO and well-grounded in the contract research arena.

In Fiscal Year 1995, HumRRO saw its largest surplus in years. During this period, greater consideration was given to divesting the firm of its for-profit subsidiary. The amount of work available to HII under small-business set asides was decreasing, making the costs and strain of maintaining two sets of books less worthwhile. During 1995, the parent organization received an offer for HumRRO International Inc. (HII) and undertook negotiations for the sale of the company. On October 1 of that year the transaction was completed. Under the deal, HumRRO was to continue to provide cost-reimbursable support services to the new owners, and staff members would continue to work on projects in which HumRRO was an HII subcontractor. Among the stipulations was one that required the new owners to cease using the HumRRO International name after a period of 2 years.

As it turned out, HumRRO had difficulty holding HII's new owners to the terms of the agreement. They missed payments, legal action ensued, and several years passed before a complete separation from the firm could be realized. Despite these problems, however, HumRRO's outlook continued to be bright. The client base was expanding, overhead costs were held to a reasonable level, and the yearly bottom line rose at a steady rate.

With the upswing in fortune, the company began to look for ways to invest for the future and fulfill its mission as a nonprofit organization. In 1998, the Meredith Crawford Fellowship in Industrial-Organizational (I-O) Psychology was created. This is an annual, one-time award given to a graduate student demonstrating exceptional research skills. To be eligible for consideration, an applicant must be a doctoral candidate whose dissertation topic has been proposed and approved by his/her graduate faculty in I-O psychology, or in a field congruent with the objectives of The Society for Industrial and Organizational Psychology (SIOP). The recipient is required to present his/her research during a visit to HumRRO, remain enrolled in the doctoral program, and progress satisfactorily towards the completion of the dissertation.

HumRRO also established an internal research and development program that funds the work of employees in areas where outside support may not be readily available. Topics addressed through this mechanism include:

- Development of a faking-resistant personality inventory
- Creation of the **A**ssessment of **T**eam **L**eader **A**bilitie**S** (**ATLAS**), a computer-based, multi-rater feedback instrument designed to measure team leader abilities from the perspective of the leader's peers, team members, and managers
- Development of a handbook on web-based surveys
- Assessment of available computer software to best meet specialized training module design requirements
- Development of an optimal person-job matching expert system



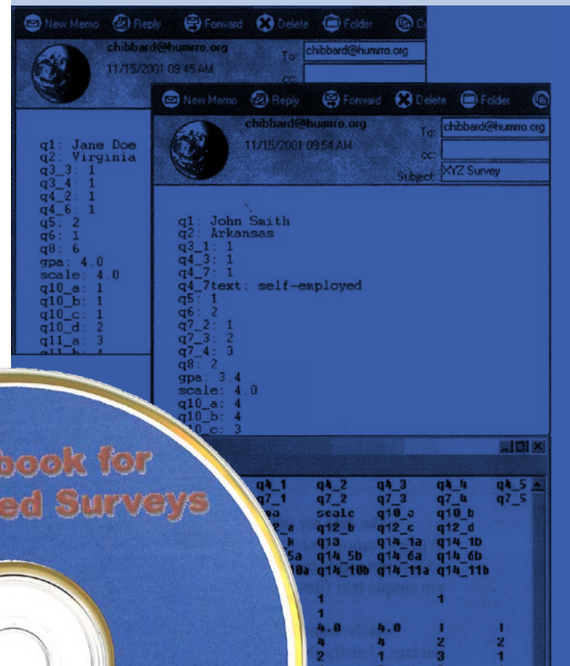
Remembering

Lola M. Zook

Memorial Service Held on Friday August 27, 1999 at the Human Resources Research Organization

Finally, HumRRO honored a longtime staff member who died in 1999. As described earlier, for many years, Lola Zook held various positions within HumRRO in support of the production of reports and other documents of the highest quality. Although she retired in 1976, Mrs. Zook continued to provide editorial support on an as-needed basis right up until the time of her death. In her honor, HumRRO created the **Lola Zook Award for Excellence in Technical Communication**. Nominations are gathered each year from the output of staff members, and an outside group of experienced technical editors carry out evaluations.

It is safe to say that, at the start of the new century, HumRRO found itself in its healthiest state since becoming an independent organization. The road to this point was long and winding, and on more than one occasion HumRRO appeared to have sidetracked up a dead end. It seemed somehow fitting that the effort and devotion of so many people over the years should result in HumRRO being in such a positive spot as it completed its first 50 years of service.





HumRRO Interim President, Robert "Bob" Sadacca (right).

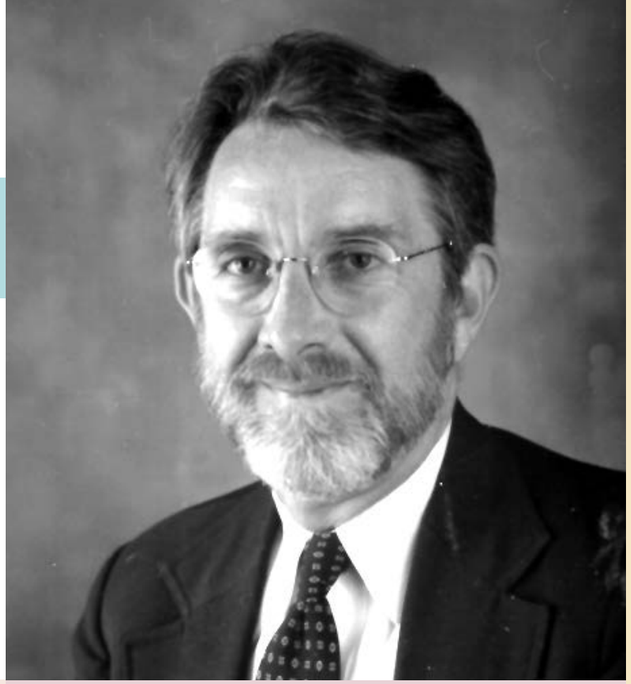


Carl J. Thorenson receives the 1999 Meredith P. Crawford Fellowship from HumRRO vice president, Bill Strickland.

CHAPTER 5

HumRRO PRESIDENTS

WILLIAM C. "BILL" OSBORN



BILL OSBORN came to HumRRO in 1961 after receiving a bachelor's degree from Whitman College in Walla Walla, Washington, and a master's degree from Purdue University. At that time he had completed all requirements for a Ph.D., except for his dissertation which was entitled *A Factor Analysis of Decision Making Situations*. Osborn was hired as a Research Associate in HumRRO's Armor Division at Fort Knox, Kentucky. His initial work assignments included tasks known as **MOBILITY** and **TRAINCREW** where he summarized research on decision making and conducted studies in the area of field vigilance.



Over time, Osborn supervised the development, administration, and analysis of proficiency tests for automotive and turret mechanics as part of an Army-wide evaluation of maintenance systems. He also served on a Department of Army-level team designed to prepare recommendations for revisions to Army maintenance manpower and training systems. Bill directed two major training development projects. The first was for the Department of Labor and involved preparing a four-week employability training program for the culturally disadvantaged. He also headed efforts to develop a performance-oriented training program for junior officers on how to conduct performance training in units.

One of Osborn's chief interests lie in the area of methods for performance testing. Over the years, he developed a variety of such tests and conducted research on procedural problems involved in creating efficient testing systems. Among his efforts in this arena was the development of a performance test methodology for the Army and research into methods for synthetic performance testing.

In September 1974, Osborn was named director of HumRRO Division 2 with offices in Louisville and Fort Knox, Kentucky. In making this announcement, President Meredith Crawford cited several of Bill's major research projects and stated that he "has been a most effective HumRRO marketer and research team builder and is widely acquainted in Armor circles." In 1980, Osborn was named director of the Military Training Research Division by President James Singleton. Singleton cited Osborn's "high order of intellectual rigor, consummate professional craftsmanship, and effective sponsor relationships." In 1985, Osborn relocated from Kentucky to corporate headquarters in Alexandria, Virginia, where he became director of the Personnel Research Division. Four years later he retired from HumRRO after 27 years of service.

Osborn's retirement lasted about one month. Facing a time of severe economic stress, the HumRRO Board of Trustees asked Bill to return to the organization in August of 1989 to become president. Over the next 5 years, he guided the staff through HumRRO's most difficult period, providing confidence, reassurance, and leadership. Once the firm was back in solid condition, Osborn finally got his wish and retired for good on June 30, 1994. But he couldn't stay away from HumRRO. Six months later, he became a member of the Board of Trustees, a position he held until May 2010.

In announcing the appointment of Laurie Wise as Bill's successor, James McHugh, chairman of the Board of Trustees, spoke of the selection process.

> *We were also greatly assisted…by the strong participation of HumRRO staff, both through the formal process in which many of you participated and through numerous other discussions and communications. The entire search process demonstrates to us in numerous ways that all of you, under the extraordinary leadership of Bill Osborn, have done an astounding job of pulling together creatively to bring us through the difficult times and to emerge as a productive and strong team.*

Debbie Marcum served in administrative role in HumRRO's Kentucky office for over 47 years until her retirement in 2020. For a HumRRO newsletter article she was asked to name her most memorable HumRROvian. Her response was as follows:

> *I've been at HumRRO long enough to say that I've worked with several memorable people, and they are all fond memories. In all sincerity, I have to say Bill Osborn is my most memorable ex-HumRROvian. I remember being introduced to "Mr. Osborn" the day I interviewed for the admin job, and I remember being fearful of "Mr. Osborn" when I was first hired. It did not take long to realize the fear was unfounded and I started calling him "Bill." Bill was a great teacher and leader. He laid the foundation for teamwork, dedication, and taking pride in being part of HumRRO. Since I was still a teenager when I joined HumRRO (put away the calculators people), he also watched me grow up and gave some good advice over the years. I will always have great respect for him.*

William C. "Bill" Osborn died on July 18, 2023, at age 89.

SELECTION, CLASSIFICATION, AND SUCCESSION

DURING THE 1990s, HumRRO continued its long tradition of conducting research on selection and classification tools. This period was also marked by an increase in the work that involved the design, development, and often the implementation of customized operational testing programs. This discussion of HumRRO's selection and classification work focuses first on military research primarily associated with the Armed Services Vocational Aptitude Battery (ASVAB). Recruiting studies are examined next, followed by several projects that looked at specific populations or specific jobs. Finally, the focus will shift to non-military studies.

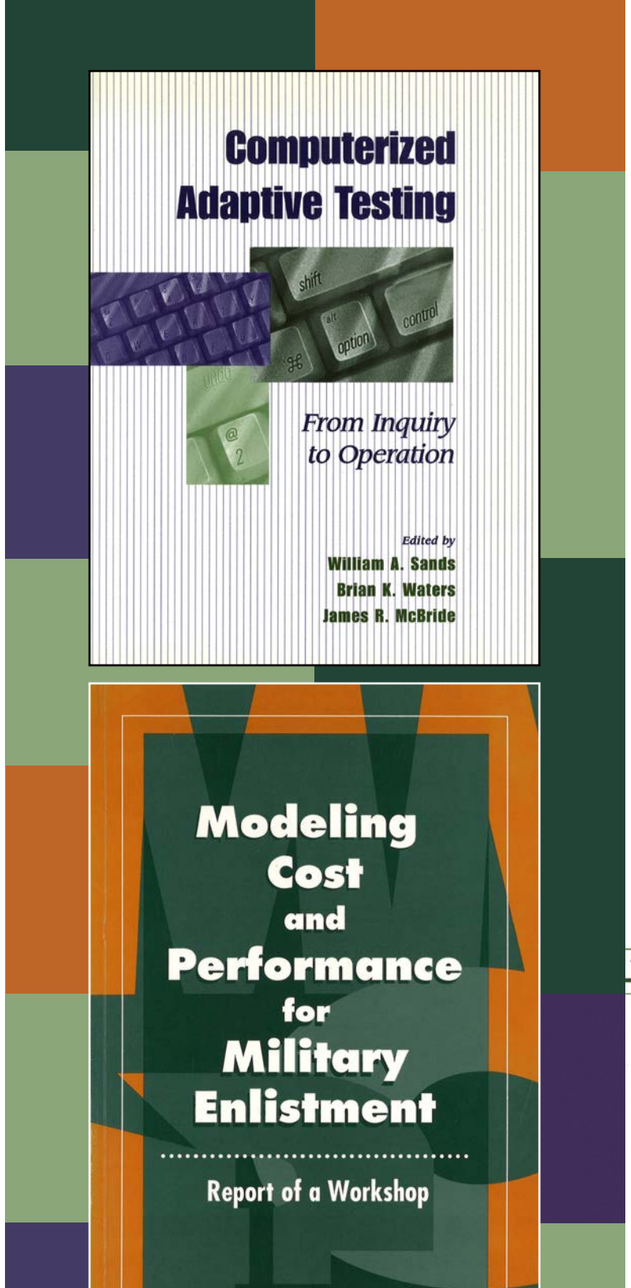
The ASVAB

HumRRO teamed with several contractors to conduct the National Longitudinal Survey of Youth, 1997, for the Departments of Labor and Defense. A central goal of this project was to establish norms for the ASVAB. HumRRO participated in the administration and analysis of a computerized-adaptive-test version of the test battery and an on-line version of a new DoD vocational interest inventory. A nationally representative sample of more than 18,000 youth took these two instruments. HumRRO was responsible for designing and conducting various pilot tests and methodological studies, as well as participating in the norming of the two instruments.

In an Army-sponsored study, HumRRO personnel sought to describe the operational procedures used by each of the services to classify service members into military jobs. Researchers then compared the various approaches to Army procedures as well as to an alternative set of models. The team established criteria for evaluating the costs and benefits of the models, developed an evaluation plan, and performed a feasibility test of that plan. The results supported the evaluation of a variety of possible changes to the enlistment screening process.

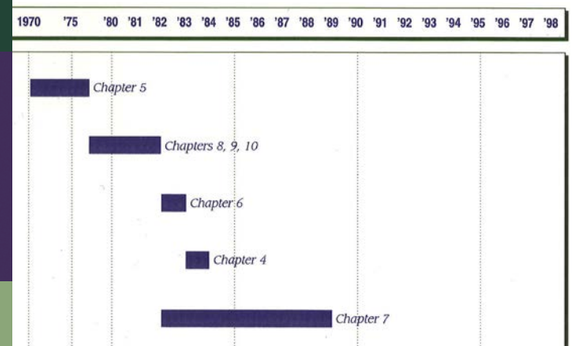
HumRRO researchers undertook a large-scale effort to develop a method for linking recruit quality requirements and job performance data, and to develop a cost/performance trade-off model for setting enlistment standards. HumRRO developed quality-performance linkages within job clusters based on data collected through the Job Performance Measurement projects. They provided an empirically grounded basis from which the services could report to Congress the distribution of ability required in a given year's recruits that would achieve satisfactory overall performance levels at a minimum cost. This distribution standard was then used to develop a trade-off model for evaluating the relative costs and effectiveness of various quality mixes for reaching performance goals. Work from this project was featured in a book published by the National Academy Press, *Modeling Cost and Performance for Military Enlistment*.

Several projects over this period concerned the creation of a computerized adaptive version of the ASVAB. Computerized adaptive testing, or CAT, is a method in which the selection of test items presented to an individual is dependent on answers to previous items. If a person demonstrates a low level of knowledge through his or her responses to the test, the computer subsequently chooses items from the range of questions that fit this level. This is a much more efficient method of administering tests, in that time is not wasted presenting easy items to those who would have no problem with them, or hard items to those unable to correctly respond. Over a 5-year period, HumRRO personnel studied the impact of CAT-ASVAB on the future of military screening, examining alternatives for both computerized and paper-based testing. Based on the outcomes of this research, DoD converted from paper to computer testing in all of its Military Entrance Processing Stations starting in 1996. HumRRO personnel were also involved in the production of a book that documented the research and development of CAT as a means of administering the ASVAB. The result, *Computerized Adaptive Testing: From Inquiry to Operation*, tells the history of the CAT-ASVAB, including the practical lessons learned along the way. The authors also provide reference information for practitioners developing computerized testing systems.



HumRRO conducted a series of studies for the United States Navy that addressed a wide range of issues pertaining to the development and evaluation of personnel selection and classification instruments, assessment methodologies, and technology. Among the projects performed through this vehicle were the following:

- Investigation of the properties of a situational judgment test to assess social intelligence
- Examination of the use of the ASVAB for the selection of recruiters
- Study of the potential for simplifying the subsets of ASVAB test scores used for occupational classification
- Development of a compensatory prediction model to identify those who may depart service prior to completing their terms
- Development of an adaptability screening model based on non-cognitive factors (e.g., biodata)

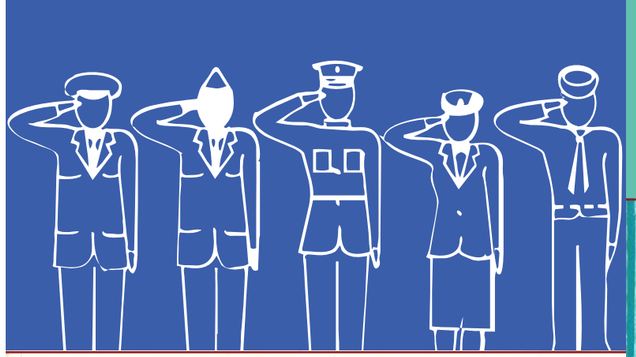


The use of biographical information in the selection of military members was the subject of a book to which HumRRO personnel contributed. *Adaptability Screening for the Armed Forces* examined the military selection process, the role of biodata in selection, and the experience of various military services in their use. A book also resulted from a two-day invitational conference convened by HumRRO for the Army Research Institute. Experts in the field of selection and classification were invited to submit papers that spoke to promising and needed directions for Army-sponsored research in conceiving the human attributes that underlie performance in Army jobs, measuring such attributes and performance, using the information for selection and classification, and judging the utility of the applications. The volume that resulted was entitled *Personnel Selection and Classification*.

To respond to a need for joint-service coordination in selection and classification research, HumRRO researchers undertook a project to develop a roadmap for such efforts in the form of a research agenda. This work involved six tasks:

1. Identify classification research objectives
2. Review classification tests and make recommendations
3. Review job requirements and make recommendations
4. Review criteria and make criteria development recommendations
5. Review and recommend statistical and validation methodologies
6. Prepare roadmap

To carry out this work, researchers: interviewed selection and classification experts and decision-makers from each service; conducted systematic reviews of specific predictor, job analytic, criterion, and methodological needs, and; integrated the findings into a master research plan.

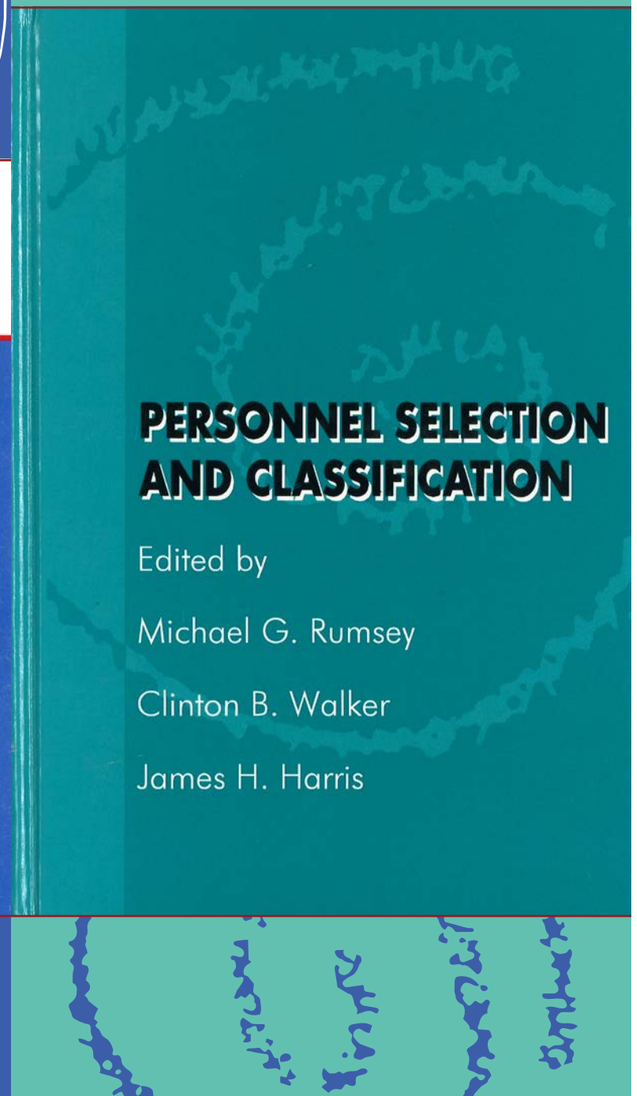




Adaptability Screening for the Armed Forces

Edited by
Thomas Trent
Janice H. Laurence





PERSONNEL SELECTION AND CLASSIFICATION

Edited by

Michael G. Rumsey

Clinton B. Walker

James H. Harris

Recruiting

As DoD moved from the draft to the All-Volunteer Force (AVF), managers realized that there was a need to become familiar with the field of marketing research. Suddenly the military services were in competition with civilian employers to reach members of the prime recruiting pool and convince them of the value of military service. HumRRO personnel provided guidance in this regard through several research efforts. In one such project, staff examined market research studies and developed an annotated bibliography. They then synthesized this work and derived conclusions for ways in which prior research could be used to guide marketing efforts within DoD. In another study, researchers analyzed data from the DoD-sponsored Youth Attitude Tracking Study (YATS) to uncover factors related to the desire to enlist in the military, other than self-stated intention to do so. Existing career decision models, surveys, databases, and measures of aptitude were reviewed to aid in the development of new measures to be incorporated into YATS. Project staff developed and piloted a telephone-administered aptitude test and correlated the results with Armed Forces Qualification Test scores. In an attempt to uncover further influences on the enlistment decision-making process, researchers conducted interviews with adolescents and their parents as well as with a sample of youth who had decided to enlist. The results pointed to a variety of important factors, including recruiter contact and advertising. The instruments developed were further refined and tested in a subsequent project, along with recommendations for their eventual use. Finally, as part of an in-depth study of the vocational decision-making process, HumRRO conducted interviews with service and DoD marketing and advertising staff, interviewed 200 new recruits across the country, and led focus groups with 125 recruiters. These efforts resulted in detailed data to inform the work of recruiting operators, marketing and advertising managers, and researchers.

Subpopulation Studies

The Chief of Staff of the Army sought the development of a selection method to identify members of the Army National Guard and the United States Army Reserves for duty in peacekeeping operations in the Sinai. HumRRO conducted research to derive individual peacekeeping performance measures that formed the basis for behaviorally based rating scales and job knowledge tests. Researchers revised the original task and knowledge requirements, derived from military training and doctrine materials, through a series of workshops with NCOs who had been previously deployed to the Sinai. Researchers uncovered 10 peacekeeper dimensions that were used as the basis for the rating scales. They then administered the scales to troops in the Sinai in May 1995. The results allowed for the setting of scores that were used in further validation research.

The U. S. Army J. F. Kennedy Special Warfare Center and School requested a needs analysis that would contribute to the recruitment of high-quality personnel, reduce attrition, and increase readiness and unit performance. HumRRO researchers performed a job analysis of Special Forces occupations by:

(a) Conducting workshops in which critical incidents and task/attribute ratings were collected,

(b) Analyzing the data,

(c) Developing performance categories and behaviorally based rating scales, and

(d) Analyzing the linkages between tasks and attributes.

Using these data, researchers developed a roadmap that identified key decision points in Special Forces accession, specified the available and potential predictors needed to select and assign soldiers, and linked performance measures to each key decision point.

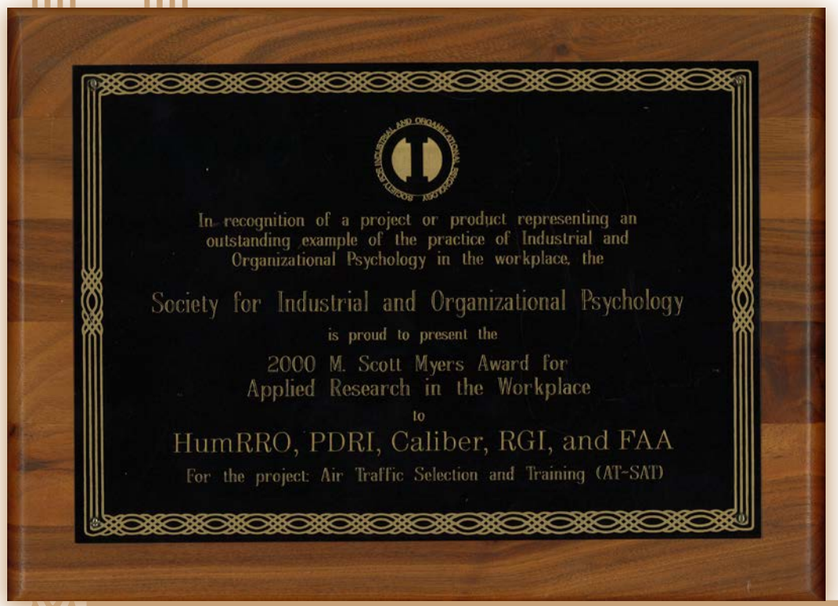
Although the Army seeks to enlist recruits of the highest possible caliber, manpower managers recognize the fact that conditions may arise that require the enlistment of individuals of lower aptitude. HumRRO was asked to provide assistance in selecting individuals of lower aptitude by isolating alternative predictors that could be used to identify those who nonetheless have potential for successful service as soldiers. With the historical literature and Project A data serving as a guide, researchers evaluated potential predictors for their relationship to various performance measures. The criteria included attrition, promotion, reenlistment eligibility, and actual reenlistment. HumRRO conducted these analyses within jobs and job families to shed light on the occupations in which lower aptitude personnel were most likely to achieve success.

Non-Military Studies

HumRRO personnel developed a valid entry-level selection process for the Federal Bureau of Investigations Special Agent job. The initial step was to conduct a comprehensive job analysis to identify the critical entry-level job tasks as well as the knowledge, skills, abilities, and other characteristics (KSAOs) required to perform those tasks. Researchers developed a survey that was sent to a sample of agents and their supervisors. The agents were asked to rate tasks in terms of their importance to their jobs and the amount of time spent on them. Supervisors were asked to rate the importance of the KSAOs, as well as where and when they thought they should be acquired (e.g., prior to hiring, in basic training, on the job). The data were used to develop a two-hurdle selection process. The first involved a series of paper-and-pencil measures, including a test of logic-based reasoning, a situational judgment test, and a biodata instrument. The second hurdle included a role-play exercise, written simulations, video simulations, and a structured interview. Researchers developed standardized scoring guides for the simulations.

To validate the selection tests, HumRRO created new measures of Special Agent job performance, including appraisal scales and paper-and-pencil job knowledge tests. Project staff then conducted a criterion-related validation study in which predictor and criterion data were collected from more than 800 Special Agent job incumbents. The validation results suggested that some tests were redundant. Given this, some measures were eliminated in the final FBI Special Agent entry-level process.

HumRRO employed a similar methodology for the Virginia State Police. Based on job analysis data, the project team developed a structured interview, a video-based simulation of cognitive abilities, and measures of reading comprehension and writing ability for use in the selection of State Troopers and Commercial Vehicle Enforcement Officers. The test battery was administered to 400 applicants, and subsequent data analyses confirmed its validity and reliability.



The Federal Aviation Administration became cognizant of an imminent need to hire a large number of Air Traffic Controllers (ATCs) due to an increase in expected retirements. Working as part of a team, HumRRO researchers assisted in the creation of a computerized predictor battery, the development of criterion measures, the collection of appropriate pilot test and validation data, and the analysis of those data. The results enabled the team to deliver a validated, legally defensible selection battery with supporting documentation that could be used on delivery. The final battery included a diverse set of tests such as a computerized simulation, applied math, analogies, and tests that involve multi-tasking, dial reading, and attention to detail. Data management was a particularly challenging aspect of this project, given that there were over a dozen test files from each of 1,500 participants along with paper copies of performance ratings filled out by supervisors and peers. These data were collected from 15 sites along with archival and employment information from personnel records. The careful management and control of this information was essential to the project's success. HumRRO, PDRI, Caliber, RGI, and the FAA received the 2000 Scott Myers Award for Applied Research from the Society for Industrial and Organizational Psychology as a result of their work on this project.

2000
M. Scott Myers Award
for Applied Research
in the Workplace

1991—2000

HumRRO supported operational selection and promotion efforts for a host of non-military clients by developing valid structured interview programs. The methodology typically involved conducting a job analysis or identifying relevant competencies for the target position. Then, working with subject matter experts, structured interview questions were designed to tap the job requirements. In addition, they developed rating scales with behavioral anchors to assess candidate responses. Finally, interviewers receive comprehensive training in the process. Among the clients for which HumRRO developed structured interviews were the Federal Aviation Administration, the Department of Commerce, the U.S. Marshals Service, the Drug Enforcement Agency, and the D.C. Department of Health. Using the methodology just described, HumRRO researchers developed two assessment center exercises to evaluate applicants to Social Security Administration's Advanced Leadership Program. Project staff designed the entire assessment center and interviewing process, prepared all related assessor/interviewer and administrative materials, trained assessors and interviewers, and administered the process.

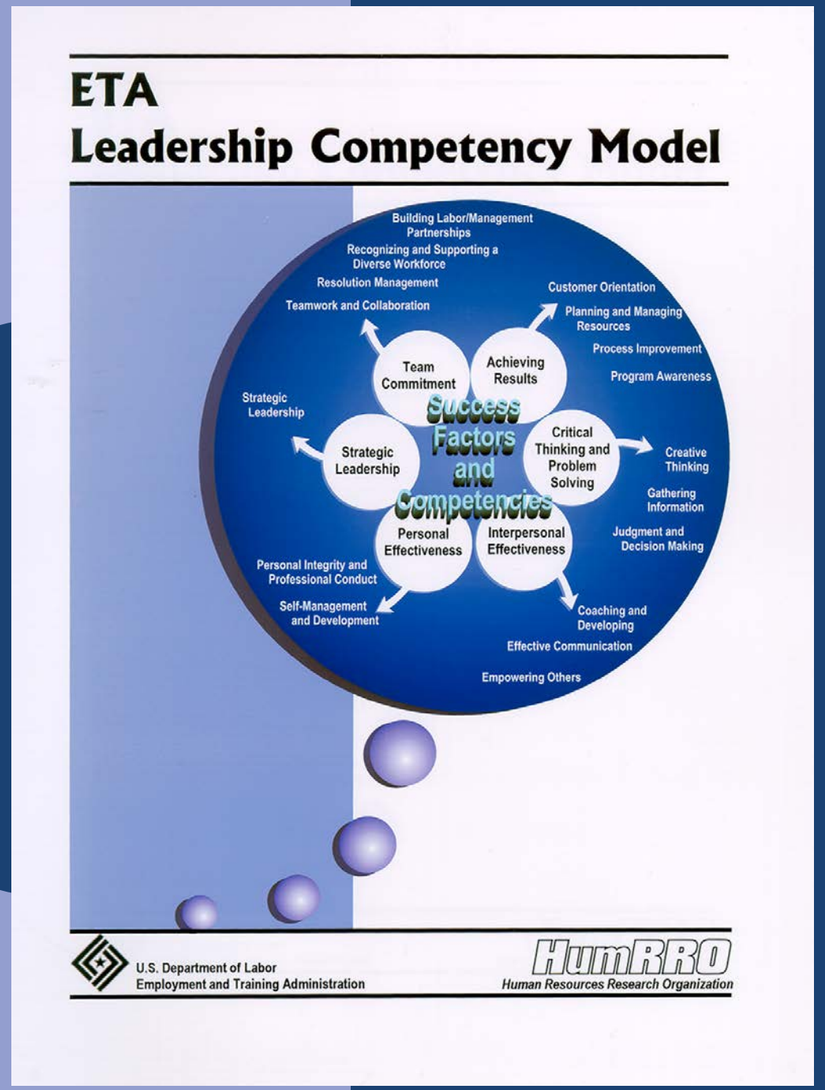
For the Drug Enforcement Agency (DEA), HumRRO personnel conducted a job analysis for all Special Agent positions. Then, based on these results, staff followed a content-oriented development process to create two separate assessment centers—one for promotion to the supervisory special agent position and the other for promotion to the mid-manager level. Each assessment center involved job simulations, including role-plays, in-basket tests, and written assessments. Project staff also developed behaviorally based rating scales to evaluate the readiness of personnel to be promoted to higher grades, and a career development system to inform them of the job experiences and training that would facilitate their advancement within DEA.

The House Appropriations Committee mandated that the Department of the Treasury analyze the impact of potentially large numbers of Criminal Investigator retirements. The Treasury Department was asked to report on the problem, the status of workforce planning, and legislative or administrative actions that might be required. HumRRO analyzed Central Personnel Datafile information on Treasury's Criminal Investigators to determine the nature of the retirement and accession situation for these positions. Researchers developed a dynamic simulation model to use data from the previous 5 years to project the number of retirements that could be expected in the next 5 years among its Criminal Investigators. Project staff analyzed accession needs, the current recruiting market, and the distribution of Criminal Investigators by grade, age, experience, and eligibility for retirement. They then prepared a report for the House Appropriations Committee to satisfy the congressional mandate. In addition, HumRRO presented briefings on the findings to Treasury's law enforcement bureaus, the Under Secretary for Enforcement, and the Assistant Secretary of the Treasury Department (Office of Management).

HumRRO researchers conducted an analysis of the FBI Special Agent job.







EMPLOYEE & ORGANIZATIONAL DEVELOPMENT

Employee Development

HumRRO personnel worked with the Federal Aviation Administration to improve its Supervisor Identification and Development Program (SIDP). The first step in the SIDP was the Peer-Supervisor Assessment (PSA) rating scales that were used to screen individuals before they took part in the Skill Based Interview (SBI). This latter component determined an individual's eligibility to be considered for promotion. HumRRO revised the PSA by conducting a job analysis. The team interviewed Air Traffic Controllers and their supervisors and collected reports of critical incidents of performance. Researchers translated this information into 34 behavioral items, then pilot tested and revised them. Various scoring options were evaluated and cutoff points formulated. In an extension of this work, HumRRO used the job analysis materials to revise the SBI by developing three role-plays, knowledge-based interview questions, and scoring mechanisms for each.

In another project conducted for the FAA, HumRRO conducted a study to develop an updated set of competencies reflecting the shifting organizational demands and expectations. Working with subject matter experts, staff members identified the non-technical knowledge, skills, abilities, and other characteristics required to perform successfully at each of four organizational levels: workforce, supervisory, management, and executive. These elements were grouped into competencies and then, based on survey data, the competencies important for successful performance at each level were identified. Researchers then developed a model that summarized the findings.

As part of its overall strategic plan to move from a bureaucratic structure to a consultative, customer-oriented organization, the Employment and Training Administration within the Department of Labor sought to move toward a competency-based Human Resources System using a generic leadership competency model. HumRRO conducted forums with ETA leaders to verify the actions they performed and the relevant knowledge, skills, and abilities required to do so. Based on this work, researchers developed a leadership competency survey that was administered to all first-level, mid-level, and executive managers within the agency. The survey results formed the basis for a self-assessment instrument that was distributed to all ETA employees to allow them to identify areas in which they could enhance their skills. HumRRO conducted a similar effort for the Department of Energy, using literature reviews, interviews, and data evaluation to develop a self-assessment guide and managerial development handbook.

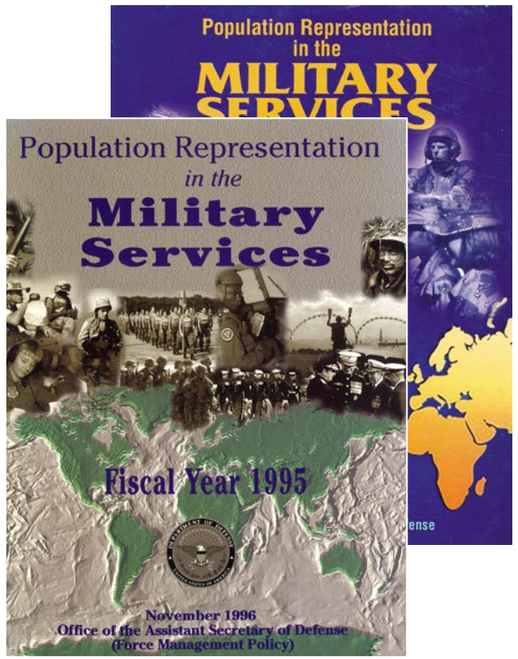
An extension of this type of work is represented by a project conducted for the Veterans Benefits Administration. The VBA was interested in developing a Service Delivery Network that required collaborative work styles of their managers. Toward this end, HumRRO devised a teamwork assessment system (TAS) that included a peer assessment instrument administered via the web. The items described observable behaviors reflecting collaboration and teamwork grouped into meaningful categories called performance dimensions. The results were summarized for managers who had been trained in their interpretation. HumRRO also developed materials to assist managers in using the feedback to build on strengths and address areas in need of development.

Organizational Development

During this period, nearly 40 percent of the Army's personnel were civilians employed in support roles throughout the world. The management of this diverse, complex workforce required innovative and comprehensive systems. In a large, multi-year project, HumRRO personnel provided support to the Army's efforts to improve policies and programs in the area of civilian personnel management. In one example, researchers developed a valid, legally defensible selection system for first-line supervisors that included a scoreable in-basket exercise, a supervisory interview guide, and behaviorally anchored rating scales. Researchers also studied the barriers to success for women and minorities in the civilian workforce based on the finding that neither group was well represented in the Senior Executive Service. Finally, HumRRO personnel analyzed data from the biennial survey of Army civilians and assisted in another survey of Army personnel managers in support of the development of a strategic plan for civilian personnel management and research.

The 1996 Department of Transportation Authorization Bill exempted the FAA from certain provisions of Title 5 of the U.S. Code (Government Organization and Employees). This exemption provided the agency an opportunity to develop a personnel system with greater flexibility in hiring, training, compensating, and placing employees. The new system, designed by employee task forces, was introduced on April 1, 1996. In providing the exemption, Congress proposed that an outside entity be employed to evaluate the resulting efforts. HumRRO staff members assisted the FAA in meeting this requirement by developing both formative (in-process) and summative (outcome) evaluation plans. They then conducted a variety of activities to implement those plans, including establishing baselines for evaluation, examining core compensation plans, and assessing satisfaction with personnel reforms.

People leave organizations for a wide range of reasons. Tracking those reasons can be a valuable resource for managers as they seek to maintain qualified personnel and create an inviting work environment for new employees. In an effort to enhance the information available for continuous improvement efforts, gain insight into the reasons for departure, and assess the attitudes and opinions of those who were leaving, the Department of Education sought to establish a systematic method of collecting such data from departing employees. HumRRO personnel designed, developed, and implemented an exit interview for political appointees and a survey for regular employees that tapped, among other things, their views of the Department and their reasons for leaving.



HumRRO conducted several projects during this time frame that sought to examine the diversity within organizations. For several years, HumRRO personnel were responsible for compiling the volume *Population Representation in the Military Services*. This congressionally mandated report provides demographic characteristics of active-duty applicants, active and reserve enlisted personnel, and officers. Such demographics include age, race/ethnicity, gender, marital status, education, geography, and socioeconomic status. HumRRO personnel also developed an Internet version of the so-called "PopRep."

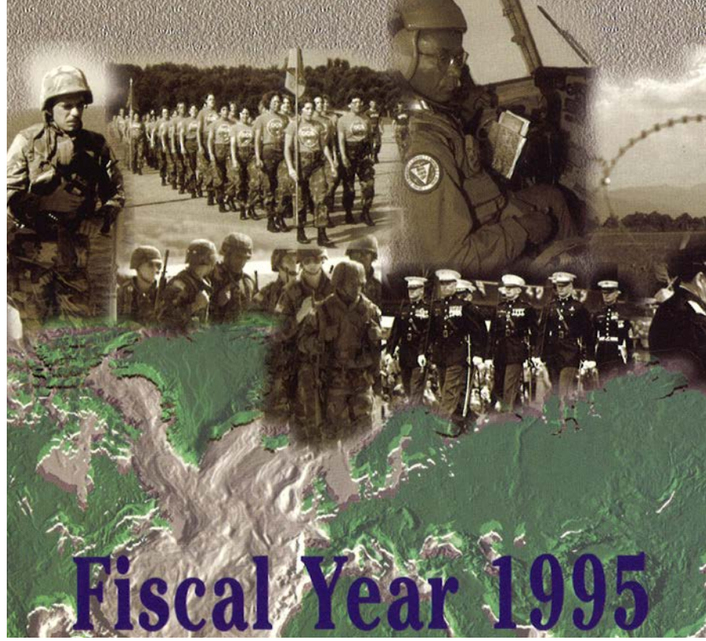
For the Architect of the Capitol (AoC), HumRRO conducted a comprehensive workforce analysis to examine diversity and identify barriers to fair employment practices. This analysis addressed three questions:

(a) Is there a representation problem?

(b) If so, how great is the problem?

(c) What changes could be implemented to address the issues found?

Researchers developed an overall profile of the AoC staff and compared the results to representative civilian organizations in the Washington, D.C. area. Comparisons were also carried out within major occupations and by grade level. Using legally defensible procedures, HumRRO researchers determined the degree to which underrepresentation of minorities existed in the AoC staff. Finally, barriers to advancement were explored through focus groups with staff members. All of these analyses formed the basis for recommendations for interventions to establish consistent and fair personnel policies and procedures.









Firefighters conduct simulated fuel spill fire training at Fort Belvoir, Washington, D.C., 1999.

Compensation

HumRRO staff undertook several compensation studies during this period. Typically the goal of such work is to provide data on the relative compensation of employees in a given organization as compared to their counterparts performing similar jobs in different settings. HumRRO examined the job classification and pay structure of employees in the District of Columbia Courts and U.S. District Courts and found that D.C. Court non-judicial employees in comparable positions were relatively undercompensated.

Researchers conducted an analysis of the pay administration systems for the Metropolitan Washington Airports Authority (MWAA) and helped redesign job evaluation components to better accomplish its mission and improve its pay competitiveness. HumRRO also surveyed market pay practices for MWAA firefighters. A similar methodology was used in a project for the Systems Administrators Guild. In this case, HumRRO:

(a) Redesigned SAGE's salary profile survey for 1999,

(b) Provided advice on preparing it for web-based administration,

(c) Developed a database and conducted statistical analysis of survey responses,

(d) Collected comparison salary data from publicly available surveys, and

(e) Prepared reports describing the salary survey.

Finally, staff members conducted an Income Survey for members of the Society for Industrial and Organizational Psychology (SIOP). The results were reported in the Society's newsletter and the database made available to organizations wishing to evaluate their compensation practices for I-O psychologists in various settings.

Certification

Certification testing is typically a voluntary process in which individuals are recognized for specialized knowledge or skill. This differs from licensure, which is most often a government requirement necessary to practice a particular profession or occupation. Both licensure and certification testing grant a designation to indicate an individual's competence, and therefore usually require testing of knowledge and skill as well as evaluation of education and/or experience. The methodology HumRRO typically uses to develop a certification program involves the following steps:

1. Job analysis
2. Test design
3. Test development
4. Standard setting
5. Scoring
6. Program maintenance

Several formats are typically used in certification testing. Often the exam will have a multiple-choice component to test job knowledge. Oral and practical exams are sometimes used when there is a need to test skills and abilities that are not assessed well in a written format. Eligibility and recertification criteria are also considered components of the certification process and must be developed based on the profession's job requirements. Over the decade of the 1990s, certification program development became an increasingly visible area of work within HumRRO, involving a wide range of clients. Staff members performed all or part of the program development process for such organizations as the Association of Legal Administrators, the American Board of Independent Medical Examiners, and the National Private Truck Council.

TRAINING

HumRRO's TRAINING WORK during this period mirrored client needs in both content and process. The projects represented an apparent shift from longer-term research and development efforts to quick turnaround efforts to meet immediate requirements. This change was also reflected in the preferred instructional media, which seemed largely to shift away from more time-intensive methods toward those that would allow for quick delivery of training to the field. There were exceptions to this general trend, of course, the largest example of which was the simulation work performed by HumRRO personnel at Fort Knox.

Methods

In a project for the U.S. Navy, HumRRO personnel investigated the judgmental heuristics—or mind-sets that occur in Navy teams in order to identify corrective procedures. Team members conducted a review of existing research on individual, group, and team decision processes to determine the heuristics used for decision-making, the conditions under which the heuristics produce judgmental biases, and team processes that could decrease the likelihood of biased situational assessments. They then examined Navy team tasks to determine whether the conditions for team biases are likely to occur. Finally, researchers synthesized this information to develop specific, empirically testable hypotheses along with the procedures to test them. The outcomes of this effort included an enumeration of the conditions under which team performance is likely to be biased, and team training principles that can be applied to overcome this phenomenon.

In a project for the U.S. Air Force, HumRRO scientists developed a new research method for evaluating the fit of people to different learning environments. After reviewing the relevant literature, researchers developed a Training Characteristics Survey (TCS) to identify the critical aspects of instructional settings that may vary across courses. The TCS yielded course-specific data that could be fed into multilevel regression procedures to predict training outcomes based on student and course characteristics. The method provided quantitative and qualitative data for evaluating how the settings in which people learn affect success rates.

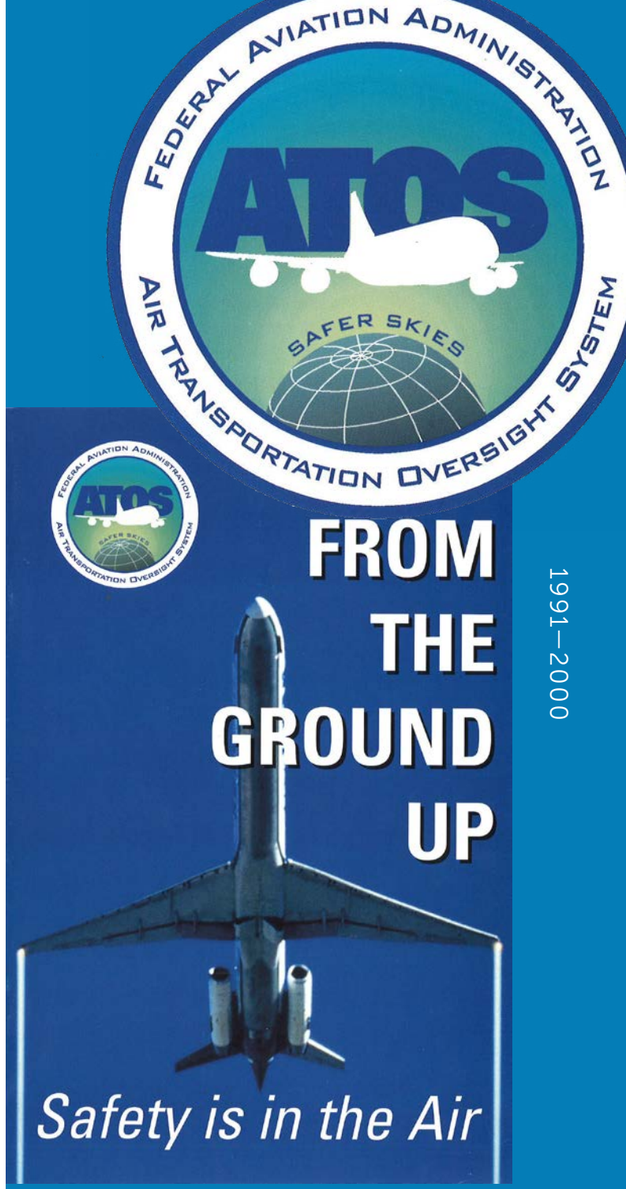
The National Training Center (NTC) provides unit training to Army personnel in simulated desert combat conditions. Working as a subcontractor, HumRRO personnel assisted in a long-term research project that sought to define the unit training and personnel characteristics that contribute to performance outcomes in this setting. The project team collected extensive data on units during the 6-month train-up period as they prepared for their NTC rotation, along with additional data after they returned to their home stations. Such data included training resources and activities, training management, personnel characteristics, leadership quality and style, and unit cohesion. This extensive database was used in guiding the Army's development and revision of its training policy, systems, and procedures.

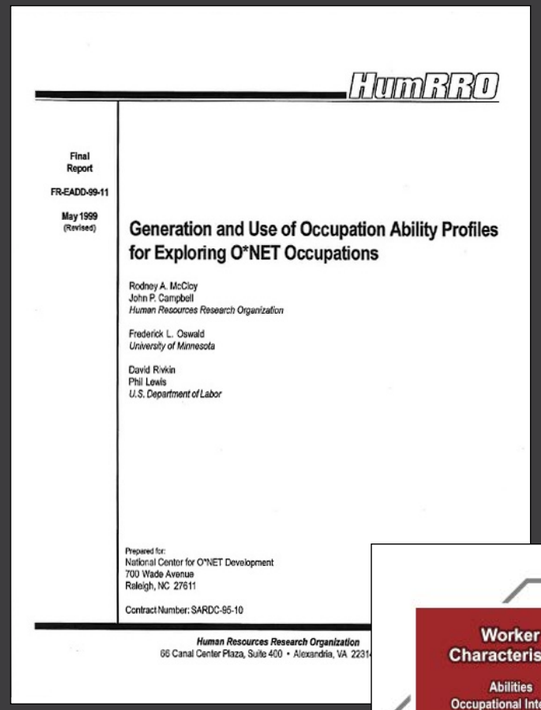
HumRRO staff continued to examine the effectiveness of training devices during this period. In **PROJECT PHANTOM**, researchers examined the trade-offs between the training resources available and the desired level of task proficiency. They developed decision-analytic tools, including one for selecting training scenarios given proficiency level, task importance, and task difficulty; and one for selecting training devices given training requirements and device capabilities. Under **PROJECT SAFEGUARD**, researchers identified six stand-alone training aids that could be used for armor training and reviewed the available research on their effectiveness. They then examined the gunnery instructional programs in place at that time, with particular attention paid to the constraints on the training. This information was synthesized in the form of device/aid-based strategies for training gunnery skills.

Training Development

A prime example of HumRRO responding to a need to develop and field a training program quickly was a project conducted for the American Red Cross (ARC). The Food and Drug Administration (FDA) had reviewed the ARC's blood-banking operations and found that there were variations in administrative functions across regional entities of the organization. FDA mandated that procedures be standardized, and to achieve this goal, the ARC set about developing a single computer system and a set of operating procedures for its personnel nationwide. HumRRO led a team of contractors that developed training on these new and revised procedures. Because of the impending implementation deadline, this work had to be accomplished quickly. Working with already-developed module prototypes, the HumRRO team translated the new standard operating procedures into job-specific training modules. They conducted train-the-trainer sessions so that ARC personnel could disseminate the instruction to the field in advance of the system changes coming online.

The Federal Aviation Administration faced a similar situation in its Flight Standards Service, which is tasked with issuing and managing the operating certificates of domestic carriers operating under Federal Aviation Regulations. Through this program, inspectors conduct surveillance of air carriers to ensure they are complying with regulations and, more importantly, are continually improving their level of safety. The FAA decided to reengineer this process based on a system safety model. The result was the Air Transportation Oversight System (ATOS). HumRRO personnel led a team of researchers/developers who assisted the FAA in identifying and defining the job tasks and helped in conducting job task analysis to support training development efforts. When this process was complete, training was developed for the entire initial cadre of certificate management teams and other necessary personnel. Approximately 900 individuals underwent this training in a 3-month period.




HumRRO

Final Report

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May 1999 (Revised)

Generation and Use of Occupation Ability Profiles for Exploring O*NET Occupations

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John P. Campbell
Human Resources Research Organization

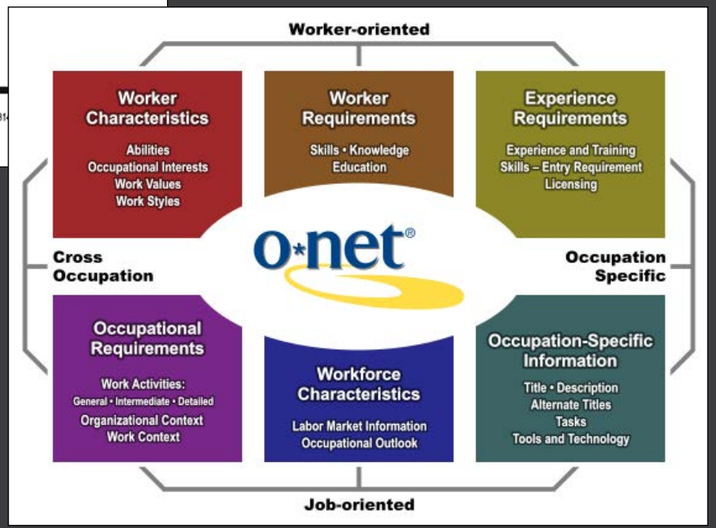
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The Employment and Training Administration of the Department of Labor had primary responsibility for overseeing the development of the Occupational Information Network (O*NET). This major effort was inspired by the need to replace the Dictionary of Occupational Titles (DOT) with a more up-to-date and technologically advanced system of occupational information and data. Over the years, the DOT has been used extensively by a wide range of people, including employment counselors, job seekers, and researchers. The development of O*NET, therefore, was a much-awaited event. HumRRO personnel took part in this process in a variety of ways. In one effort, instructional developers created an O*NET orientation program that introduced its capabilities and functions. The training was developed in a modular format so that it would be of value to a wide variety of audiences. The 4-hour program included information on the development of O*NET, provided an overview of the O*NET 98 viewer, and allowed participants to obtain hands-on practice with the various functions available. HumRRO also developed a train-the-trainer package that facilitated the fielding of the program to the widest range of interested parties.

HumRRO participated further in the development of O*NET by assisting in the development of:

- A Work Importance Locator and Work Importance Profiler,
- The development of occupational reinforcer patterns for more than 1,100 Occupational Units (OUs),
- The estimation of ability profiles for DOT occupations,
- A method for aggregating DOT-estimated profiles into ability profiles for each of the OUs,
- The Work Importance Locator/Profiler and Ability Profiler score reports, and
- A classification structure for OUs.

In a variety of other projects, HumRRO personnel participated in the development of the following training programs:

- Contract administration and alternative dispute resolution for Federal mediators
- Fundamentals of credit union administration
- Use of the Compliance Data Warehouse by staff of the Internal Revenue Service
- Performance evaluation training for new supervisors in the Bureau of Alcohol, Tobacco, and Firearms
- A seminar on instructional systems design for the Ohio/Midwest Labor Management Committee
- A workshop on teambuilding for the Chief Counsel's Office of the IRS
- A seminar on human resources for a group of 70 business owners and management experts in Japan

HumRRO personnel provided assistance to the Pension Benefit Guaranty Corporation (PBGC) on a number of training-related projects. In one instance, designers created an instructor-led course to give pension law specialists, auditors, and new actuaries the skills to determine benefit allocations and payment methods under specific PBGC programs. HumRRO personnel developed, evaluated, and revised a course on qualified domestic relations orders (QDROs) for benefit analysts and administrators as well as other relevant positions within PBGC. They then created an advanced version of this same course for administration via the internet.

Simulations

Working largely under sponsorship of the Army Research Institute (ARI), personnel at HumRRO offices in Fort Knox, Kentucky and Monterey, California performed a series of projects involving simulation technologies applied to training. The objective of **PROJECT SIMUTA** was to design, develop, and evaluate a comprehensive experimental program for providing collective training to Army National Guard (ARNG) armor battalions and staffs using virtual and constructive simulation. HumRRO personnel worked under subcontract to develop and refine the innovative, prototype training program, construct and evaluate comprehensive training support packages, and develop methods for program growth and exportability. This work served as the foundation for several other efforts, including the design and documentation of a prototype training program for digitized Command, Control and Communications (C3) using virtual simulation. HumRRO personnel conducted the formative evaluation of the training program during its initial implementation in accordance with approved evaluation criteria based on training standards. The results of the evaluation enabled researchers to identify effective methods and lessons learned to address a variety of training issues and training program extensions.

From 1994 to 1999, HumRRO was part of a team of contractors at Fort Knox that carried out research, development, and studies relating to combined arms training issues for Active and Reserve component soldiers and units, with a focus on the armor force. The work involved the development of brigade staff exercises and small group exercises under an effort known as Combined Arms Operations at Brigade Level, Realistically Achieved through Simulation (COBRAS). The HumRRO team developed simulation-based training exercises for maneuver, combat support, and combat service support elements of the Active Component mounted brigade. Training applied to all phases of the operations, including planning, preparation, and mission execution. The training was designed to be fully exportable, using comprehensive training support packages that included tactical materials, role-player guides, observer guides, interactor instructions, training management support, and simulation initialization tapes.

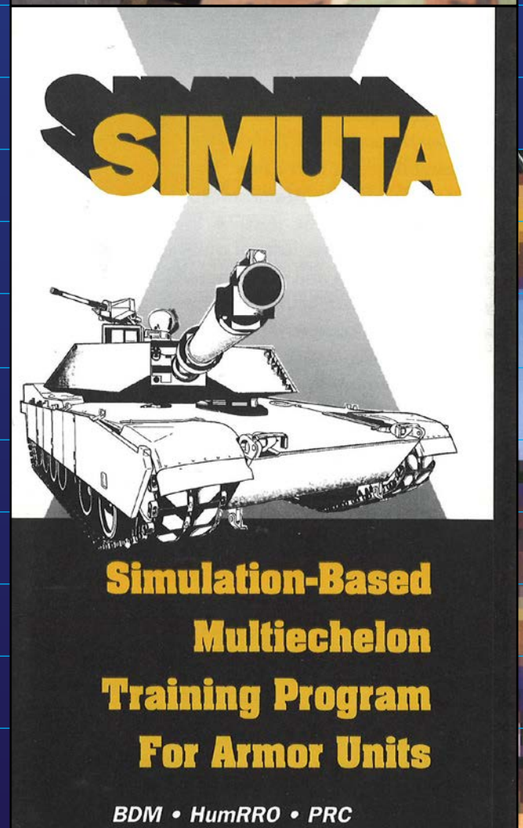
After completion of this initial effort, the team extended the training development methodology to address multiechelon training for brigade and battalion staffs, digital training for staff members and staff groups, training programs for use in the synthetic theater of war (STOW), battalion-and-below training in the Army's new Close Combat Tactical Trainer, and training support for the Mounted Maneuver Battle Space Laboratory experiments for reengineering battle command.

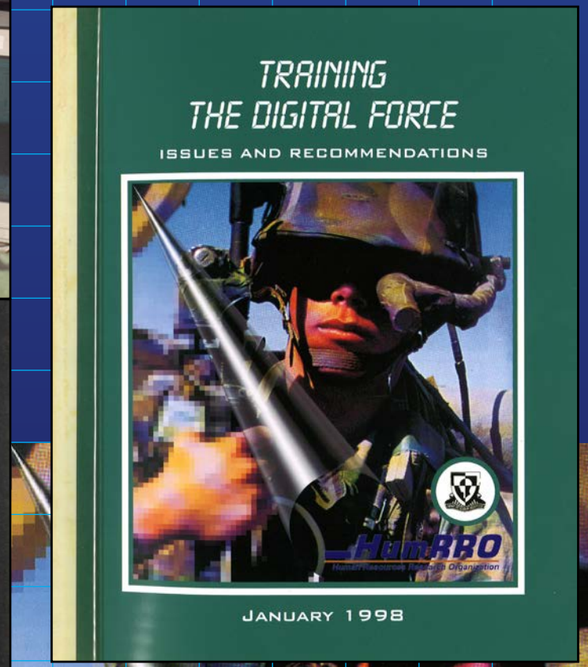
Through subsequent projects under the KNOX IQC, the HumRRO team:

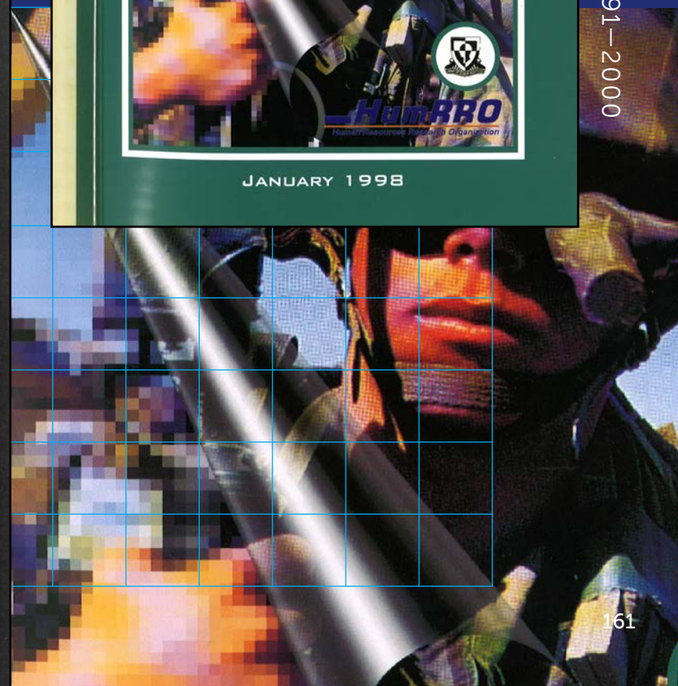
- Identified the virtual environment interface requirements for advanced technologies (speech and gesture recognition) for combat leader training
- Analyzed the performance requirements and training issues associated with the Army's move to digitization
- Developed innovative methods for automated capture of performance data during simulation-based exercises
- Designed and produced prototype computer-based tutorials for individual digital skills training, incorporating selected cognitive instructional techniques
- Examined requirements for assessing and managing simulation-based training exercises produced by Army unit trainers
- Developed and successfully fielded the Commander's Integrated Training Tool (CITT) which aids unit trainers in developing and preparing for collective training



Earl Doyle at work with Project SIMUTA, 1994.











PROGRAM EVALUATION

HumRRO's PROGRAM EVALUATION WORK during this period covered a wide range of clients and subjects. These included both private and government agencies, and involved, among other things, assessing the effectiveness of training and testing programs, measuring customer satisfaction, and evaluating a variety of policy-related issues.

The Criminal Justice Academy Division of the South Carolina Department of Public Safety offers basic certification courses in Law Enforcement and a variety of related disciplines. In addition, the Academy provides advanced training through 40 course offerings. Given that the intent of the training and testing program is to prepare law enforcement officers to perform successfully on the job, it is critical that it be comprehensive and job-related and that the associated testing be reliable and valid. HumRRO personnel conducted an evaluation of the entire academic testing program, including a review of the tests, the testing process, and associated policies. Researchers were able to offer recommendations for improvements to the program, along with staff training on how those recommendations should be implemented.

The Response and Recovery Directorate (R&R) of the Federal Emergency Management Agency (FEMA) oversees management of disaster field operations. The Office of Standards and Evaluation (OSE) is the component within R&R that has responsibility for monitoring and improving the quality and efficiency of disaster operations. During this period, HumRRO worked with OSE to accomplish two major goals:

(a) Derive customer service standards and performance standards for different aspects of the organization, and

(b) Develop an evaluation system to enable efficient collection of reliable data to assess organizational performance.

HumRRO first developed a comprehensive model that enabled FEMA to assess the overall effectiveness of customer services delivery and of each program component. The team reviewed existing materials, conducted focus groups and interviews with FEMA customers, developed performance standards, and designed and conducted customer service surveys. The Inspection Services survey was administered to more than 11,000 FEMA customers. The researchers used this feedback to develop better customer service standards and measures and to evaluate the performance of the contractors who conduct the home inspections. HumRRO also designed two telephone-administered surveys that were used to pilot test items for additional survey instruments. These instruments became integral parts of the FEMA evaluation system.

The Social Security Administration determined that in the future their executives and managers would be functioning in an environment that is increasingly global in scope, automated, demographically diverse, and highly competitive, particularly in terms of resource allocations. To meet this challenge, the agency was implementing a multi-tiered career development program, spanning all management employee levels from entry-level supervisors to the senior executive service (SES). These programs provide employees with opportunities to learn new skills, build upon existing skills, and obtain broadened perspectives and experiences. The SSA contracted with HumRRO to conduct an evaluation study to assess the value of the SEE candidate development program (CDP) and Advanced Leadership Program (ADP).

Of particular concern was the programs' impact on the agency's leadership initiatives and succession planning effort, as well as the benefits gained by individual program participants. In the first phase of the evaluation study, the research team gathered feedback from all types of stakeholders of the SES CDP (i.e., executives, program participants, mentors, supervisors of record, and assignment supervisors). Data came from individual interviews and focus groups. Based on this feedback, HumRRO researchers developed and administered four separate on-line surveys to gather feedback from CDP/ALP participants and non-participants. Information from the interviews, focus groups, and surveys was integrated into a report that highlighted strengths associated with the programs and provided recommendations for their enhancement.

Public release photos from the National Archives Catalog.

Left: FEMA housing inspector records damages to a home that was impacted by Hurricane Sandy, 2012.

Right: FEMA inspectors participate in media segment demonstrating home inspection process, 2010.



1991–2000

Executive Order 12862, (1993) "Setting Customer Standards," required that all Federal executive departments and agencies that provide direct services to the public, "survey front-line employees on barriers to, and ideas for, matching the best in business" customer service standards. This information was to be used to guide the development of customer service plans as well as other efforts undertaken as a result of the National Performance Review. In line with this edict, the National Aeronautics and Space Administration (NASA) contracted with HumRRO to conduct an internal survey of a representative sample of its employees to identify, among other things:

(a) Who NASA personnel see as their internal and external customers,

(b) The level of knowledge and understanding of customer service concepts,

(c) Barriers to matching best-in-business customer service standards,

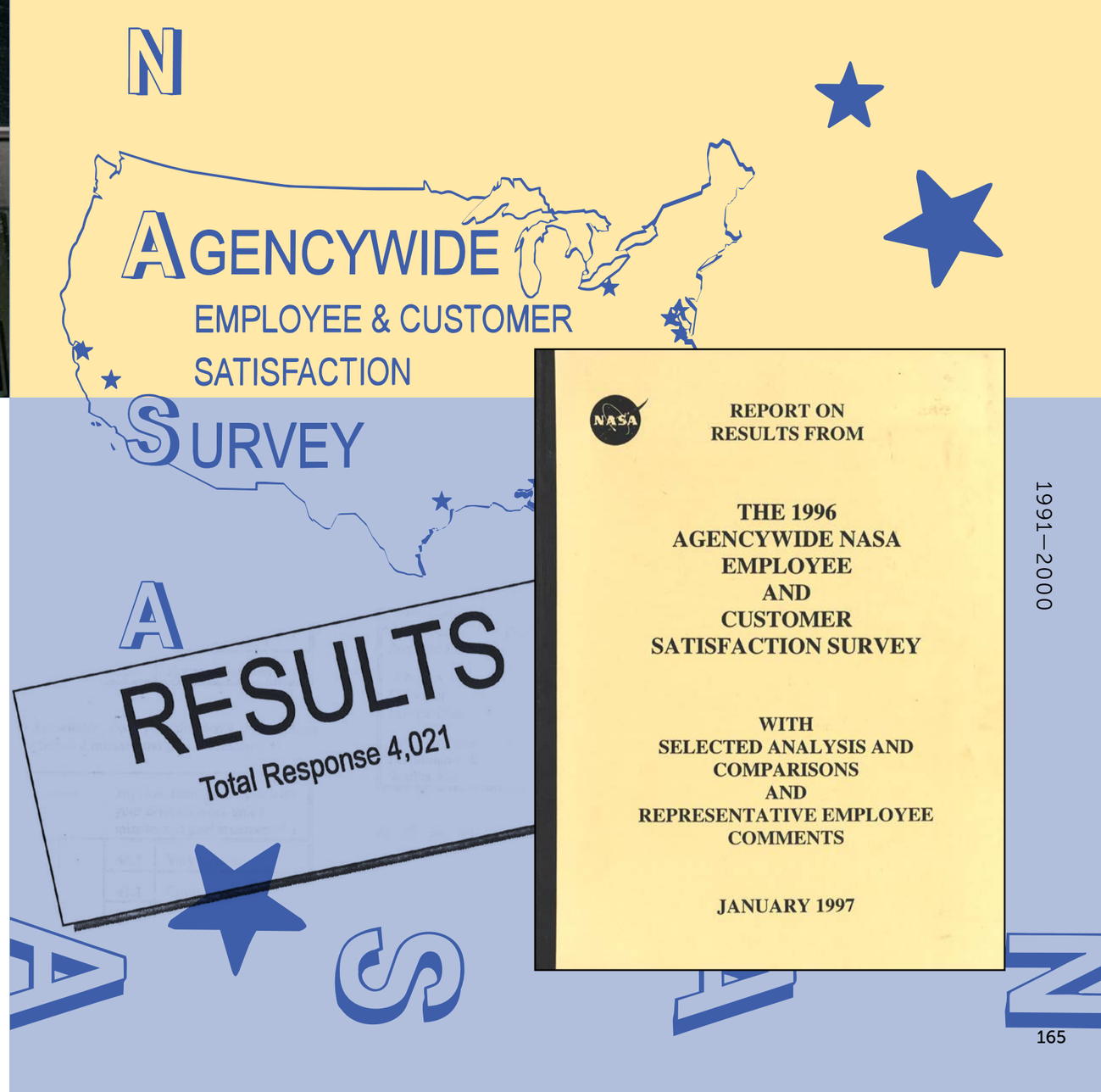
(d) Ideas for improving current practices in this regard, and

(e) Relationships between the expectations of employees as service providers and those of recipients.

HumRRO worked closely with staff from NASA's Office of Continual Improvement to draft, pretest, and revise the survey instrument. Researchers selected a sample of 4,000 employees representing various centers, activities, and grade levels, and distributed surveys through agency channels. HumRRO scanned the returned forms, tabulated the results, and presented them in both report and briefing formats. Approximately one year later, NASA senior management sought to repeat the survey to assess employee attitudes after a period of some turmoil and reorganization. HumRRO staff worked with the Office of Policy and Plans to revise several questions based on new information needs, and conduct the survey distribution, processing, and analysis phase. The sample size was increased to over 7,000, and all phases of the project were completed in a 6-month time frame.

E Tech Faculty Summer Employees at NASA, 1990.

Public release photo from the National Archives Catalog.



1991–2000

As a subcontractor, HumRRO took part in an evaluation of the Student Testing Program, through which DoD offers the Armed Services Vocational Battery free of charge to high schools across the country as a counseling tool. HumRRO's principal role in the evaluation was to assess the program's impact on recruiting. Through database analyses as well as surveys and interviews with recruiters and students, researchers examined the effect of the program on persons deciding to enter the military, the impressions of the military that result from participation, and its effectiveness as a generator of recruiting leads. These data were supplemented by interviews with recruiters to gain insight into the potential operation and effectiveness of the testing program in the future, given the impending Defense downsizing.

HumRRO also served as a subcontractor in a large-scale effort to investigate the state of Army families and evaluate the programs in place to serve them. The genesis of this research was the finding that policies and practices toward Army families were largely developed in a piecemeal and uncoordinated fashion. Decision makers within the service decided to institute a program of research that would lead to a more integrated approach to serving families and thereby actualize the notion of a "partnership" between families and the Army. There was also recognition that, to the extent that a sense of community is fostered within the Army, positive effects could be realized in terms of readiness and retention. The broad range of questions that this research addressed required a variety of quantitative and qualitative techniques, including surveys, observations, focus groups, research models, interviews, and longitudinal analyses. This integrated 5-year study was the largest and most ambitious of any social science project investigating military families.

The Congressional Commission on Military Training and Gender-Related Issues was authorized by the National Defense Authorization Act for Fiscal Year 1998. Among the responsibilities of the Commission was to examine the effectiveness of military basic training formats, including the degree of gender integration. Gender-Integrated Training (GIT) was first introduced in the late 1970s based on the notion that if men and women are to function in integrated units when they take on their responsibilities in the field, they should be trained in this same manner. Since the introduction of this concept, questions were raised about its impact, both in the short- and long-term. The goal of this study was to shed light on the impact of GIT on the socialization, values, and attitudes of soldiers, sailors, airmen, and Marines over the course of their military careers. HumRRO personnel conducted a survey of some 3,600 personnel with one to eight years of service from each of the military branches. Analyses of the results included a range of methodologies all aimed at shedding light on the impact of gender-integrated basic training on subsequent service member attitudes and experience.

The National Defense Authorization Act of 1991 required that DoD establish and maintain a program to provide employment and career counseling and other assistance to service members who were leaving the military, and to their families. The Army's response


Panel supports sex-integrated training

Backs status quo in branches, asks Pentagon to keep rules against adultery

Republican control could lead to a change in policy. The Clinton administration started coed basic training in 1994.

The 10-member commission's 2,700-page report, after 15 months of hearings and site visits, is a mixed bag of recommendations

segregated training in the Marine Corps. This vote is a victory for feminists and a defeat for conservatives, who say the 5-year-old policy in the three branches has led to sex scandals and poor discipline.

"Each service should be allowed to continue to conduct basic train-

found in a gender-integrated basic training environment."

In a dissenting opinion, three commissioners said there is ample evidence that mixing sexually active young men and women during the first exposure to military life is a distraction.

superior results," said Commission Chairman Anita Blair, a lawyer. She was joined by retired Marine Lt. Gen. William M. Keys and Thomas Moore, an analyst at the Heritage Foundation.

"Many observers worry that the 'warrior spirit' is disappearing in

to this mandate was to establish the Army Career and Alumni Program (ACAP) and the creation of Job Assistance Centers (JAC). The services provided include job assistance seminars, instruction in resume writing, and individual counseling. HumRRO undertook an evaluation of these services in response to appeals for an in-depth study by the DoD Inspector General and the General Accounting Office. Researchers interviewed approximately 3,000 former Army, Navy, Marine Corps, and Air Force service members and their spouses, as well as Army civilians, who left service between October 1992 and September 1993. They were asked about transition and job search assistance received and post-separation employment along with other less tangible outcomes such as civilian job satisfaction and attitudes toward the military. Researchers conducted multivariate analyses to uncover effects resulting from ACAP/JAC participation while holding in check such factors as age, years of service, and occupation while in the military. For ex-service members, transition and job search assistance and satisfaction with such services were significant factors in accounting for variations in income, relative financial condition, and reliance on unemployment compensation. On average, the more job search assistance services respondents had received and the more satisfied with these services they were, the more they said they felt prepared for, and achieved success in, the civilian job market.



EDUCATION RESEARCH & EVALUATION

ALTHOUGH HumRRO PERFORMED WORK in educational settings from its earliest days as an independent nonprofit research firm, the decade of the 1990s saw an expansion in this arena. This development had several roots, including organizational hiring decisions that strengthened this capability and trends in public policy that led to increased need for non-affiliated, respected research organizations that could apply rigorous analytic techniques to important issues in the field of public education.

In response to Circuit Court and State Supreme Court rulings, the Kentucky Legislature enacted the Kentucky Education Reform Act (KERA) in the summer of 1990. KERA directed sweeping reforms in educational standards, practices, and governance. The act also required the establishment of a performance-based assessment and accountability system, known as the Kentucky Instructional Results Information System, or KIRIS. The thrust of the program was to go beyond rote memorization of facts toward a deeper understanding of what is being taught, including creative application and integration of knowledge. In 1995, a panel of nationally known testing experts hired to review progress to date issued a report that questioned both the reliability and validity of KIRIS and put forth 12 recommendations for study and/or change. In response, the State Department of Education released a contract for further KIRIS development and implementation. As a subcontractor, HumRRO personnel took part in this work by:

- Assisting with the planning of a long-term program of validation research
- Conducting convergent validity studies that examined the relationship between KIRIS assessments and national tests (e.g., ACT, NAEP)
- Examining historical changes in basic facts and mechanics for 4th grade students, and
- Reviewing changes in classroom practices consistent with KERA and KIRIS educational goals

In a subsequent contract, HumRRO took the lead in continuing research on the renamed Commonwealth Accountability Testing System (CATS). This assessment included multiple-choice and open-response items tailored to the state's core curriculum. HumRRO scored and equated the items using item response theory models, and the resulting student scores were classified into performance categories (Novice, Apprentice, Proficient, and Distinguished). The student scores were then used to derive school performance indexes. For both students and schools, system reliability depended on the consistency of the classification decisions and the underlying scores. Through a series of generalizability and classification studies, HumRRO assessed this dimension. In addition, researchers conducted school visits designed to track the impact of the accountability system and examined the relationship between scores on CATS and those on a national norm-referenced test.

dodea
DEPARTMENT OF DEFENSE EDUCATION ACTIVITY

The Department of Defense Education Activity (DoDEA) serves students in schools around the world. Effective management of this widespread operation requires an integrated planning and evaluation process that provides data for continuous improvement. One measure of effectiveness is the success students achieve when they leave DoDEA schools, either to attend other educational institutions or pursue other endeavors. HumRRO worked with DoDEA to plan a longitudinal assessment that would provide insight into these outcomes. HumRRO developed surveys to assess the opinions of graduating seniors and their parents regarding their DoDEA experience. Researchers also collected information regarding future plans. These data shed light on a number of issues of importance to DoDEA management and provide the baseline for future survey efforts.

The National Skills Standards Board (NSSB) was created to promote the adoption of a voluntary national system of skill standards. The NSSB had voluntary partnerships with representatives of employers, unions, community leaders, and education/training organizations. These partnerships were responsible for the development of standards, which were then submitted to NSSB for endorsement. As a subcontractor, HumRRO was hired to support the Endorsement Committee, whose responsibility it was to develop the process for evaluating the standards submitted. In one such effort, researchers sought linkages between the endorsement criteria that had been developed and legal and professional test development and validation guidelines. They then developed operational requirements to define the type of documentation needed to show compliance with the criteria. In another project, HumRRO conducted a preliminary review of four knowledge and skill taxonomies to determine the extent to which each would support the development of a common knowledge and skills taxonomy for use by the NSSB. HumRRO also recruited members for an Advisory Panel to develop recommendations for the NSSB regarding a common language for the skill standards. Researchers prepared for and conducted the meetings and summarized the outcomes.

HumRRO staff were involved in several projects related to efforts to institute nationwide testing for various purposes. Researchers were asked to review preliminary item analyses and item selection for three speeded paper-and-pencil tests included in the General Aptitude Tests Battery (GATB). They revised the analyses and selection of items where necessary and documented the results for the Department of Labor, which sponsors this test. HumRRO also provided consulting services to assist the development of a computerized-adaptive version of the GATB.



HumRRO staff conducted an analysis of the impact of low motivation on estimates of student achievement as measured by the National Assessment of Educational Progress (NAEP). They extended the Examinee Persistence Model to include graded response items and used it to estimate the impact of low motivation on NAEP results. Researchers evaluated methods for reducing or adjusting this impact.

HumRRO staff evaluated three specific aspects of the development of the Voluntary National Tests (VNT) of fourth grade reading and eighth grade mathematics. In one effort, researchers examined the test to determine if there were sufficient numbers of high-quality items to permit pilot testing and if the screening process for low-quality items was working effectively. They also reviewed the cognitive laboratory procedures used in the process of developing test items and assessed their impact. Finally, HumRRO worked with the University of Wisconsin and staff from the National Academy of Sciences to organize workshops on voluntary national testing, observe test development activities, and draft evaluation reports.



High school students in library, 1990. Public release photo from the National Archives Catalog.

EQUITY 2000 was a 6-year district-wide systematic educational reform effort undertaken by six major urban school districts across the nation under the guidance of the College Entrance Examination Board. The goal was to close the gap between college-bound individuals and the success rates that existed between minority and non-minority, disadvantaged and advantaged students. Among the components of the program were the following:

- Policy changes to end tracking and raise standards for all students
- Ongoing professional development for teachers, counselors, and principals
- Improvement of school involvement with students, parents, and families
- Creation of academic enrichment programs
- Formation of school-community partnerships
- Ongoing monitoring of progress towards the established goals

HumRRO personnel conducted an in-depth study of one of the school districts taking part in EQUITY 2000. The team visited the sites and analyzed data for a comprehensive naturalistic-oriented evaluation. These data were used in conjunction with an independent quantitative evaluation to develop an overall case study for the district. HumRRO staff also compiled the document *Equity 2000 and District Change: Signs of Success*, a summary report of all research efforts associated with the project. The report includes a description of the pilot studies and a synopsis of the various research strategies used in their evaluation.

For the College Board, HumRRO personnel conducted several evaluations of *Pacesetter* programs. Pacesetter encompassed a rigorous set of courses primarily for high school seniors. The curricula included mathematics, English and Spanish. For the first evaluation effort, HumRRO personnel attended a weeklong summer institute to learn about the teaching and learning methods employed in the English Pacesetter program. Researchers then designed an experimental-control group evaluation strategy at four sites across the country. The research comparison included 21 teachers and 28 classes, of which 15 were Pacesetter classes and 13 were controls. A variety of measures were taken or gathered, including test results, teacher proficiency ratings, and an administrator survey. Findings revealed that the Pacesetter program resulted in significantly higher outcomes on three of the four key performance measures. Several years later, a similar evaluation was conducted for the Pacesetter Mathematics program.



AP students during class reviewing for their upcoming AP exam, 2013. Leehspride, CC BY-SA 3.0, via Wikimedia Commons.

The College Board administers the Advanced Placement (AP) program that gives students the opportunity to take college-level courses and exams while in high school. Approximately 23,000 secondary schools around the world take part in program, with over four million exams taken annually. Experience has shown, however, that not all of these efforts are equally successful. Therefore, HumRRO researchers designed and conducted a study to isolate those factors that make for a viable AP program. Using a case study approach, the team examined 14 schools in three states that were found to have exemplary programs. Researchers spent 2–3 days in each school interviewing administrators, teachers, and students. The resulting information was used to identify commonalities and differences between the schools, along with the elements that led to the success they had achieved. The study offered recommendations to schools that were starting or expanding their AP programs, suggesting pitfalls to avoid and strategies for success.

For the College Entrance Examination Board, HumRRO researchers examined minority participation and success rates in college using data from the National Center for Education Statistics. The results showed that gains seen by African Americans in elementary and secondary education were not mirrored in college. The gap between black and white enrollment rates had widened over a two-decade time period, as had the gap in college graduation rates. Past research highlighted a variety of factors that decrease the likelihood of college completion, and these were disproportionately found in minority communities. Researchers attempted to use the data to isolate factors that were associated with higher college success rates among African Americans (e.g., size of black enrollment).

HumRRO PRESIDENTS

LAURESS L. "LAURIE" WISE

LAURIE WISE was born in San Jose, California, and moved to Redwood City when he was about one year old. He earned his B.A. from Stanford University and headed to the University of California at Berkeley where he earned his doctorate in psychological modeling and measurement. After completing his dissertation, Laurie was hired by a former professor to work for the American Institutes for Research (AIR) in their Palo Alto office. Over his 16 years at AIR, Laurie worked on a variety of projects, including Project Talent, in which approximately 400,000 high school students across the country were tested, with follow-up testing conducted to assess their progress. He was also chief statistician for the Medical College Admissions Test.

In 1983, Laurie moved to the D.C. area to work on Project A. AIR was part of the HumRRO team that was tasked with collecting data to determine if scores on the Armed Services Vocational Aptitude Battery (ASVAB) were predictive of performance on the job rather than just in training. (See *1981-1990, Selection and Classification* on **page 103** for a complete description of this work.) Laurie led the database and analysis task, a key component to the entire undertaking. During his time in D.C., Laurie worked on a variety of other tasks, including directing a review and analysis of the General Aptitude Test Battery.



Meanwhile, for some time, the Defense Advisory Committee on Military Personnel Testing had been recommending that responsibility for the development and maintenance of military testing programs be centralized rather than defused amongst the various services as had been the custom. The services themselves were not enamored of this idea and representatives to the Manpower Accession Policy Working Group did their best to forestall it. In the end, however, the Personnel Testing Division (PTD) was formed within the Defense Manpower Data Center, and Laurie Wise became the first director. One of the major accomplishments that was achieved during his tenure at PTD was the operationalization of the computer-adaptive version of the ASVAB, which resulted in a significant reduction in the resources needed to maintain the testing program.

In 1994, Bill Osborn decided to retire as HumRRO's president after having seen the company through some trying times. Advertisements for the position were placed in various relevant publications, and eventually the field was narrowed to five candidates. Two panels of staff members were formed to conduct structured interviews with the applicants. Their input was presented to the Board of Trustees and in the end, Laurie was named president of the company.

Under Laurie's leadership, HumRRO's upward path continued. Because of his past work and reputation, along with the efforts of talented HumRRO staff, the firm's presence in the education arena rapidly grew, as did earnings overall. The internal newsletter became a monthly fixture. A series of strategic planning meetings was held and the first all-HumRRO conference took place in 2006, providing an opportunity for staff members from across the country to gather, attend interesting workshops, and socialize face to face.

Jim McHugh, then chairman of the Board of Trustees, sent Laurie a letter marking his 10th anniversary as president. He said in part:

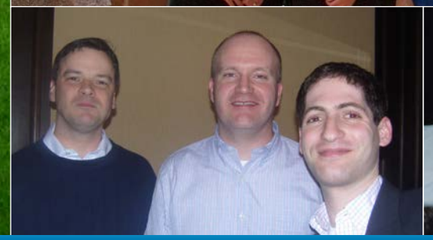
> *I am delighted you are with us. I am also delighted that your senior management team, which is so talented, creative, and interesting to work with, is with us. It is very significant that the combined efforts of you, your management team and all other HumRRO employees have had a strong positive effect on the economic health of HumRRO during these ten years. On September 30, 1994, the net worth of HumRRO was $886,677. On August 31, 2004 the net worth had grown to $4,768,284. This is significant for the long-term health of this great organization.*

In 2007, Laurie informed the Board of Trustees of his intention to step down as president and return to his much-missed Monterey, California. Recognizing his value to the company, after some discussion an agreement was reached in which he would remain with HumRRO as a Principal Scientist working from the Monterey office. In that role, Laurie continued to make major contributions, including serving on technical advisory committees for various state departments of education and co-chairing the committee that revised the *Standards for Educational and Psychological Testing*, issued by the American Educational Research Association, the National Council on Measurement in Education, and the American Psychological Association.











HumRRO THROUGH THE DECADES

CHAPTER 6.

2001—2010



Empowering Human Performance



EXPANDING HORIZONS

IN JULY OF 2001, HumRRO celebrated its 50th anniversary. A dinner was held at the Radisson Hotel located next to headquarters attended by many staff, as well as former HumRRO employees. Perhaps most notable and meaningful was the fact that Meredith Crawford was able to come and say a few words. This was followed by an anniversary conference held at the local Holiday Inn entitled *Empowering Human Performance*. There were attendees from a wide variety of organizations, including the Office of Personnel Management, the Office of the Secretary of Defense, Microsoft, and the National Skills Standards Board. Panels were held in the morning and afternoon covering such topics as the dynamic nature of work, workplace trends, and developments in training research. These were followed by breakout discussions, the outcomes of which were summarized in general sessions. Finally, a celebration was held for Kentucky staff at the Louisville Slugger Museum, also attended by many alumni.

On January 31, 2001, HumRRO had 83 employees. By December 31, 2010, this number had grown to 109. With the growth in the size of the staff, office space at headquarters was increased by leasing sections of other floors in the building as they became available. In 2007, a large portion of the 7th floor of 66 Canal Center opened up, and it seemed practical to relocate employees from the other areas to this single space. A huge amount of coordination was required to ensure that it met all employee and organizational needs.

As is detailed later in this chapter, in 2000, HumRRO was awarded a contract to serve as the evaluator for the California High School Exit Examination (CAHSEE), which required students to pass tests in English Language Arts and Mathematics before being awarded a diploma. One of the team members in this effort was a Monterey-based firm, Professional Management and Evaluation Services (PMES), founded by Sally Gensberg. In the spring of 2005, Sally approached HumRRO about purchasing her company. She planned to retire in several years and was seeking an opportunity to continue the legacy her firm had established. The Board of Trustees considered the matter and noted several positive aspects to it, including the addition of California staff to work on other projects, the expansion of HumRRO's capabilities in the credentialing arena (a core PMES focus), and the addition of four PMES contracts that had several years remaining on them. These included licensure examination contracts with the California Architects Board and the Board of Professional Engineers and Land Surveyors. It was also a plus that PMES offices were located in the same complex as HumRRO's Monterey office. On December 14, 2006, the acquisition was completed.

Beginning in 1998, HumRRO held a series of indefinite quantities contracts (IQCs) with the Army Research Institute for the Behavioral and Social Sciences (ARI) covering a wide range of topics related to manpower, personnel, leader development, and training. Among the requirements to qualify for this work was the ability to conduct large-scale survey projects. For the first two iterations of the contract a well-known survey research company was part of the HumRRO team. But as the recompete approached in the early 2000s, they made the decision to submit a proposal on their own. At the time, Board of Trustees member Carolyn Setlow was employed by Roper Starch Worldwide, which included a Social and Policy Research Group that was primarily funded through government contracts. They were data collection/survey experts who, among other things, supported the Manpower Demonstration Research Corporation (MDRC) in evaluating welfare-to-work and other social welfare programs. In 2003, Roper's parent company made the business decision to stop doing government work, which provided an opportunity for HumRRO. After lengthy negotiations (which required approval from both MDRC and the government sponsors), HumRRO completed the purchase in March of 2004 and opened a new office in Lawrenceville, New Jersey—the Center for Survey Research.

In 2005, HumRRO hired an experienced researcher who lived in Minnesota and wished to continue to do so. Given that there were already several part-time staff members in the Minneapolis area, management began considering the potential for opening an office there, and on April 1 that space was opened at the University of Minnesota Technology Center.

As was recounted earlier, when HumRRO was operating under a sole-source contract with the Army, the staff was necessarily geographically dispersed so that researchers could work in close coordination with the various branches they served. As that status changed, the locations gradually winnowed down. Through much of the seventies and eighties there were only two active sites: Headquarters in Alexandria and the field office in Radcliff, Kentucky. A contract with the Personnel Testing Division in Monterey, California led to opening an office there, with several of the key staff members working from San Diego. Expansion of research in the education arena, with many Kentucky staff involved, led to the opening of an office in Louisville in the early 2000s. HumRRO was becoming more geographically dispersed.

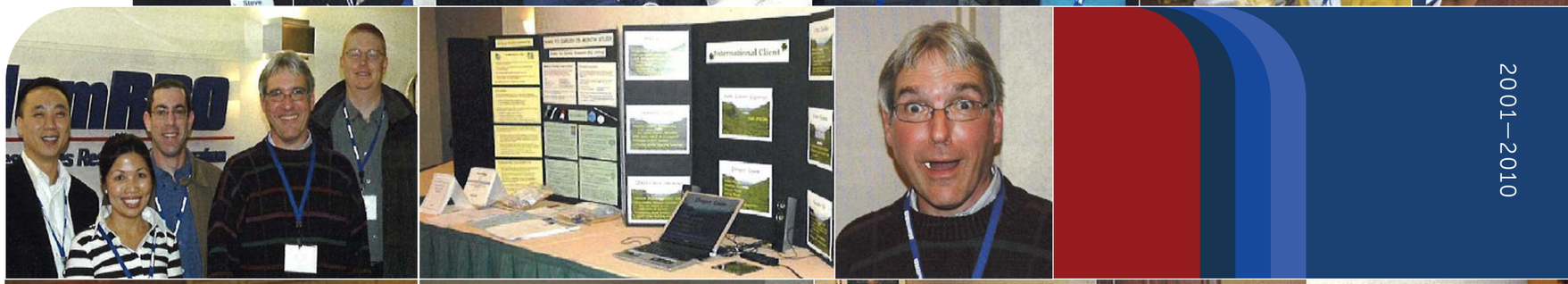
Another change that came about was an increase in the collaboration across offices. The **CAHSEE PROJECT**, for instance, necessitated a close working relationship between the Alexandria and Monterey staff along with involvement from education researchers in Kentucky. The projects conducted under the ARI IQCs frequently entailed data collection efforts that required staff members from various offices to take part. And of course all of this was abetted by advances in technology that made working closely from a distance more feasible.

In recognition of this fact, management decided it would be a worthwhile investment to bring as many staff as could attend together in one place at one time. In October of 2006, the first **All-HumRRO Fall Conference** was held at a hotel in Alexandria. General-interest workshops were conducted in the morning and afternoon, with a guest speaker addressing attendees during lunch. A session was held after the conclusion of the workshops where a presentation was delivered on the highlights of the company's history. This was followed by a reception and dinners at various local restaurants. Overall, the reaction to this effort was extremely positive, with employees expressing appreciation for the chance to socialize, learn, and develop closer bonds. As a result, it became a biennial event, contingent on HumRRO's financial status.

Another effort launched to increase ties among employees and involvement in the company was strategic planning meetings which were held in the fall in the years between conferences. Employees from across the country who wished to attend gathered at headquarters to discuss various aspects of how HumRRO functions and what improvements could be made. An outside facilitator was brought in to run the sessions, which included small-group brainstorming activities. The results were disseminated across the company and often resulted in tangible changes to policies and procedures.

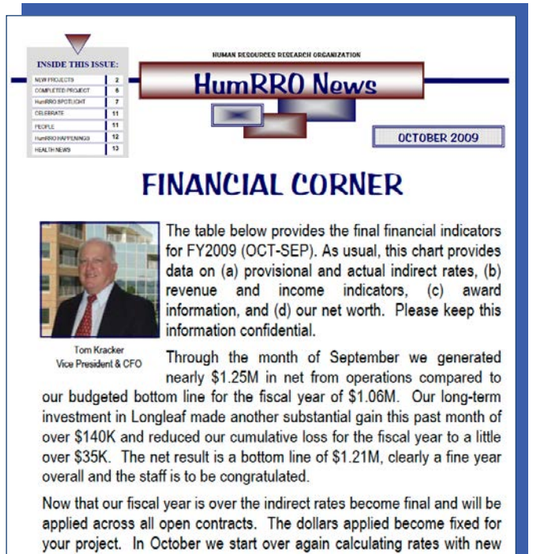
Photos from the first HumRRO fall conference held in October 2006.






By 2007, Laurie Wise had been HumRRO's president for 13 years, the second longest tenure in that position after only Meredith Crawford. Along with the responsibilities that Laurie took on as CEO of the company, he always remained active in project work and decided that was where he would like to focus his energies moving forward. After some discussions he agreed to remain with HumRRO as a chief scientist and move back to Monterey where he felt most at home. In a letter to staff, Jim McHugh, chairman of the Board of Trustees, said the following:

> *The HumRRO Board of Trustees is absolutely delighted to announce that Bill Strickland has accepted our offer to become HumRRO's president effective January 1, 2008. The Board of Trustees Search Committee considered 13 different persons for this position, and it was abundantly clear that Bill was by far the strongest candidate. And the rest of the Trustees unanimously agreed with the Committee. Bill's experience before coming to HumRRO and his experience with HumRRO gives him tremendous resources to be a great leader of this most valuable and useful organization.*



HUMAN RESOURCES RESEARCH ORGANIZATION

HumRRO News

OCTOBER 2009

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FINANCIAL CORNER

Tom Kracker
Vice President & CFO

The table below provides the final financial indicators for FY2009 (OCT-SEP). As usual, this chart provides data on (a) provisional and actual indirect rates, (b) revenue and income indicators, (c) award information, and (d) our net worth. Please keep this information confidential.

Through the month of September we generated nearly $1.25M in net from operations compared to our budgeted bottom line for the fiscal year of $1.06M. Our long-term investment in Longleaf made another substantial gain this past month of over $140K and reduced our cumulative loss for the fiscal year to a little over $35K. The net result is a bottom line of $1.21M, clearly a fine year overall and the staff is to be congratulated.

Now that our fiscal year is over the indirect rates become final and will be applied across all open contracts. The dollars applied become fixed for your project. In October we start over again calculating rates with new

To commemorate the change in administrations, an "inaugural" ceremony was held at headquarters on January 15, 2008. In lieu of a prayer, a poem was read that noted that Strickland's assumption of the office of president seemed preordained given that every other president was a William—Meredith Crawford, William McClelland, James Singleton, William Osborn, Laurie Wise, and William Strickland (see the full poem on page 181).

In the October 2009 edition of the internal HumRRO newsletter, Tom Kracker, CEO, reported the following:

> *From FY 1993 through FY 2007, HumRRO experienced steady growth in its net worth, which reflects capital and equipment. FY 2008 showed a slight overall dip because of investment losses, but FY 2009 again reflected an upward trend. The bottom line is that HumRRO has been growing and is healthy.*



As is documented later in this chapter, although the Center for Survey Research did obtain contracts from other sources, the bulk of their work continued to be with MRDC. However, the leadership within that company reevaluated their priorities and decided to shift their focus away from the types of evaluation efforts that largely funded the Center. The last major proposal the New Jersey staff issued was to use various methods to collect data from a wide range of military personnel and spouses to address the issue of whether the Don't Ask, Don't Tell Policy, which prohibited homosexuals from openly serving in the military, should be discontinued. In the end, the final proposed budget was considerably higher than a competitor, and HumRRO was not awarded the contract. At the end of June, 2010, CSR was closed, although two staff members with ongoing work were reassigned within the company.



THE INAUGURATION

BILL STRICKLAND was the third HumRRO president to be appointed from within. Given that Bill was a well-known commodity to staff at the time, on January 15, 2008, an "inauguration" ceremony was held to officially commemorate his assumption of the office. Chairman of the Board, Jim McHugh, conducted the official swearing in, and an inaugural poem was read, entitled "What's in a Name." It is reproduced here for your edification.



It started with Meredith, Crawford was he.
HumRRO's founder and president
For a quarter century.

Then came Bill McClelland,
Promoted from within.
It was life's greater forces
That made his tenure thin.

Next up was Jim Singleton,
Ten years was his stay.
It was a rocky road,
But we made our way.

Then Bill Osborn followed,
Who along with McKay's golden touch
Brought us back from the brink.
We can't thank them enough.

We all know of Laurie,
Wise was not just his name.
He expanded our horizons,
And stepped down with acclaim.

And so it seems fitting,
A higher power's will?
That we have a new president
Whose first name is Bill.

Meredith
Bill
Jim
Bill
Laurie
Bill

So I think that we all
Can now easily see
That this was a choice
That was just meant to be.

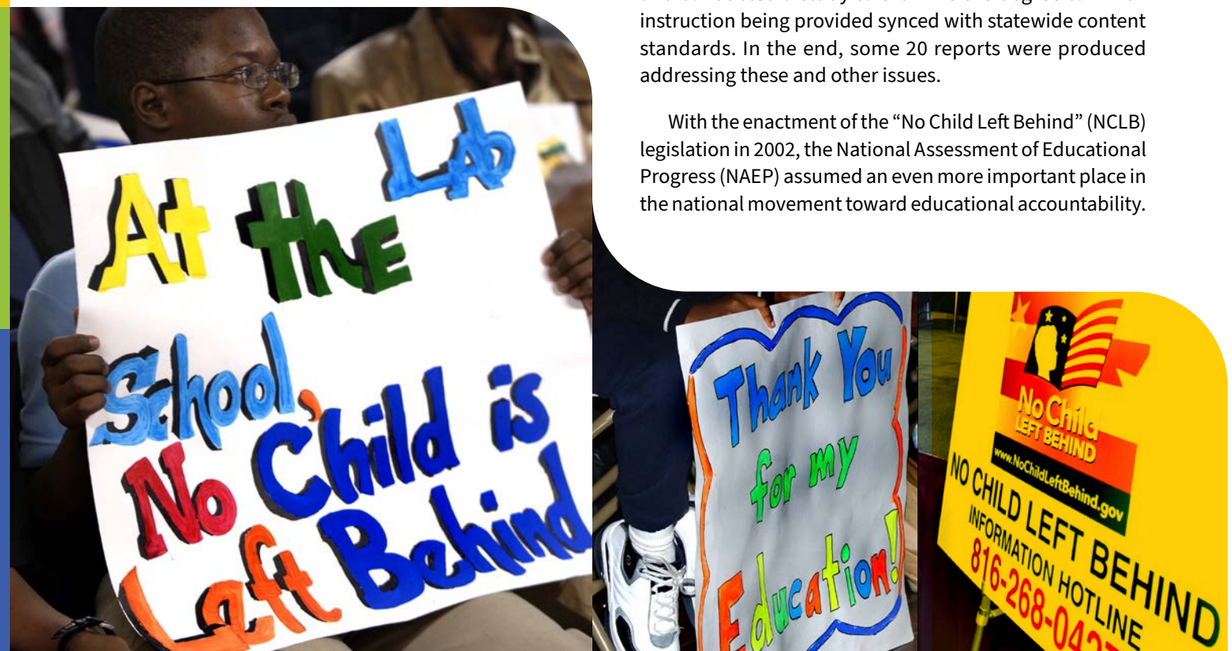
EDUCATION

IN 1999, CALIFORNIA ESTABLISHED the California High School Exit Exam (CAHSEE). The authorization required that by 2004 students would be required to pass examinations in English Language Arts and Mathematics in order to earn a diploma. The bill also mandated that an independent evaluation be conducted as part of the exam creation and implementation, and HumRRO was selected as the evaluator. The expectation was that the research would focus on the impacts of the test on graduation and college attendance rates, both overall and for specified groups (e.g., English language learners). In addition, suggestions for improving the development, administration, and use of the exam would be offered. Reports were to be submitted at the end of each year of the contract.

HumRRO's first report cited concerns over whether enough time had been allowed to prepare the exam for administration or for students to prepare for the exam. In response, an additional bill was passed authorizing the a study of the degree to which standards-based instruction was adequate to support tests such as CAHSEE. HumRRO was asked to conduct this additional study, the results of which suggested courses to teach students the content standards assessed by CAHSEE were not yet fully effective. Evaluators recommended that the graduation requirement be deferred for two years, which it was. This outcome, and the report on which it was based, received widespread attention in the media including the Los Angeles Times and the San Francisco Chronicle.

HumRRO's evaluation work continued through 2010. In addition to assessing the impact of the CAHSEE requirement, researchers analyzed test results, reviewed test questions and their alignment with content specifications, and conducted a study to examine the degree to which instruction being provided synced with statewide content standards. In the end, some 20 reports were produced addressing these and other issues.

With the enactment of the "No Child Left Behind" (NCLB) legislation in 2002, the National Assessment of Educational Progress (NAEP) assumed an even more important place in the national movement toward educational accountability.



NAEP is the only nationally representative and continuing assessment of what American students know and can do in various subject areas. In conjunction with the National Assessment Governing Board, the National Center for Education Statistics (NCES) had responsibility to implement and monitor the NAEP aspects of the NCLB legislation. Previously, a single NCES contractor coordinated with its subcontractors to create, administer, score, and report results. In a new approach, six separate contracts were awarded to cover the various aspects of NAEP (e.g., item development, sampling, and data collection). HumRRO was awarded a seventh contract to provide an independent formative evaluation of NAEP. Under the first iteration of the work from 2002 to 2009, HumRRO:

(a) Reviewed past NAEP problems for lessons learned about quality control processes,

(b) Analyzed the new procurement model and resulting contractor procedures,

(c) Developed a process model showing handoffs among contractors,

(d) Conducted site visits to monitor operations and activities, and

(e) Conducted targeted studies of NAEP processes.

A project conducted for the Center for Education Policy (CEP), an education advocacy group, also focused on the impact of NCLB. NCLB motivated activities within states to, among other things, develop a suitable accountability system where none may have existed, implement supports to encourage educational improvements, and monitor and report on progress towards NCLB goals over time. Unlike the common metric of NAEP, a single battery of tests administered across all states, this research investigated assessment systems developed within, or procured by, individual states to align with state educational content standards. As part of their work, HumRRO researchers developed profiles of all 50 states that included descriptive information and longitudinal test results, as well as analyses of student achievement gains and gap reductions over time. Interviews were conducted with state educational leaders in a sample of 22 states to obtain more in-depth insights into each state's assessment programs and obtain perceptions of the impact of NCLB. The data collected informed many CEP reports, and HumRRO supported CEP's announcements of findings in national press conferences and congressional testimony.

HumRRO's work focused on Kentucky's Commonwealth Accountability Testing System (CATS) continued throughout this period. The second contract, awarded in 2006, contained four main components:

(a) Validation evidence to support the use of the student-level scores,

(b) Validation evidence to support the use of school-level scores,

(c) Research projects on the Kentucky assessment, and

(d) Quality assurance of the test information.

To accomplish these goals, researchers conducted third-party checking of the psychometric work performed on test results, assessed the alignment of test items to the common cores state standards, and investigated the relations among alternate assessment component scores across years. They also conducted site visits to track the impact of the test, including visiting the same schools over several years to provide a window for viewing how representative schools adapted to the accountability system.

In addition to California and Kentucky, HumRRO staff performed education-related work for a variety of other states during this period, including Florida, Indiana, Minnesota, Missouri, and South Carolina. These studies involved assessing the alignment of state assessments and standards and conducting psychometric analyses to verify the results reported by those responsible for implementing statewide academic testing programs.

Photos from No Child Left Behind Act promotional activities, 2004. Public release photos from the National Archives Catalog.



CIVILIAN SELECTION, CLASSIFICATION, AND PROMOTION

THE BUREAU OF ALCOHOL, TOBACCO, FIREARMS, AND EXPLOSIVES (ATF), under a District Court directive, began to implement a number of systemic changes in its human resource practices (e.g., promotions, training). To support these efforts, HumRRO conducted a comprehensive job analysis of criminal investigator positions within the agency. Similar processes were used as have been described earlier (e.g., background research, task and KSAO list development and validation, job analysis survey of incumbents, data analysis). The resulting competencies were defined by the KSAOs and tailored to each grade level, and workshops were conducted to collect task/KSAO linkage data and critical incidents of job performance. This information was then used to design and develop performance appraisal systems for all special agents as well as processes for evaluating candidates for promotion to the field grade 14 and 15 positions. Four simulations were developed for each grade and behaviorally anchored rating scales were created for each competency measured by the simulations. HumRRO staff prepared and delivered assessor training and managed the implementation of the assessment centers. In subsequent work, the materials were revised on multiple occasions as new job analysis data became available.

As described in the previous chapter, HumRRO developed a selection process for the FBI special agent position. Due to a number of considerations, including face validity, age, and advances in testing and measurement applications, the agency required new alternate and equivalent forms of the Special Agent Selection System (SASS) to efficiently hire a high quality, diverse, and well-rounded workforce. Using updated job analysis information, HumRRO identified and developed relevant assessment tools to be used in Phase I of the hiring process. These included a situational judgment test, a test of logic-based measurement, and biodata instruments. HumRRO then conducted an extensive criterion-related validity study to provide the requisite validity evidence and to equate the two alternate versions of the test. Also for the FBI, HumRRO developed assessments for selecting Intelligence Career Service (ICS) personnel, including Intelligence Analysts, Language Analysts, and Physical Surveillance Specialists. These included assessments of analytical thinking, non-cognitive competencies (e.g., relating effectively with others), and a temperament inventory. HumRRO also developed measures of job performance against which the assessments could be validated, including appraisal rating scales and multiple-choice job knowledge tests. The assessments and job knowledge test were administered online to several hundred ICS incumbents, and supervisory ratings were collected. The validation study data demonstrated that the assessments were predictive of important elements of job performance.

To accomplish its mission, the Bureau of Census employs Field Representatives who are responsible for collecting social and economic information through face-to-face interviews with selected households. HumRRO examined recently collected job analysis data and evaluated the selection tools in use at the time. Researchers recommended modifying an existing Basic Skills Test (BST) and developing new assessments including a situational judgment test, a structured interview, and a mock interview simulating those that would be conducted in the field. Existing job performance data, which describe one's success in completing the census surveys, were used to validate the tests. The results suggested retaining the revised BST as the first hurdle and using the Structured Interview and Mock Interview as the second. Staff worked closely with the Bureau to establish cut scores for each assessment and establish administration procedures. HumRRO also prepared an administration manual and trained Census staff in implementing the tests.

During this period, HumRRO, working in conjunction with Caliber Associates, developed alternate forms for seven of the eight assessments of the test battery used in the selection of future air traffic controllers described in the previous chapter (AT-SAT). The tests for which alternate forms were developed were Dial Reading, Angles, Letter Factory, Scan, Applied Math, Analogies, and Air Traffic Scenarios. New, comparable items were created that measured the same content domains as the existing versions. Pilot test were run and an equating study conducted to allow scores from the alternate versions to be placed on the same operational scale.

Also for the FAA, HumRRO developed the Basic Electronics Screening Test (BEST) for use in selecting individuals into electronic technician occupations. The standard operating procedure had been to require new hires to pass basic math and electronics tests or complete a series of training courses on these subjects. Assessing knowledge in these areas prior to employment would ensure that individuals selected for these positions had the knowledge needed to immediately enter job-specific training. HumRRO performed a job analysis and developed test specifications. Working with SMEs, multiple-choice knowledge-based items were developed and a content validity study conducted. HumRRO then programmed the test for computer administration at the local level. In subsequent work, researchers investigated the potential for developing a random item generator for the BEST. They identified components or attributes of items that could be changed and the range of values that could be used for those components without affecting difficulty levels. Based on the results, a software-based item generator was developed and integrated with the BEST software. This greatly increased the efficiency with which alternate forms of the test could be developed.

In recognition of the fact that a large segment of the workforce of the Social Security Administration was nearing the age when they would likely start drawing social security benefits, the agency contracted with HumRRO to develop a multi-tiered career development program spanning all management employee levels from entry-level supervisor to senior executive service. HumRRO developed and implemented:

(a) An assessment center to identify qualified applicants for the Senior Executive Service Career Development Program,

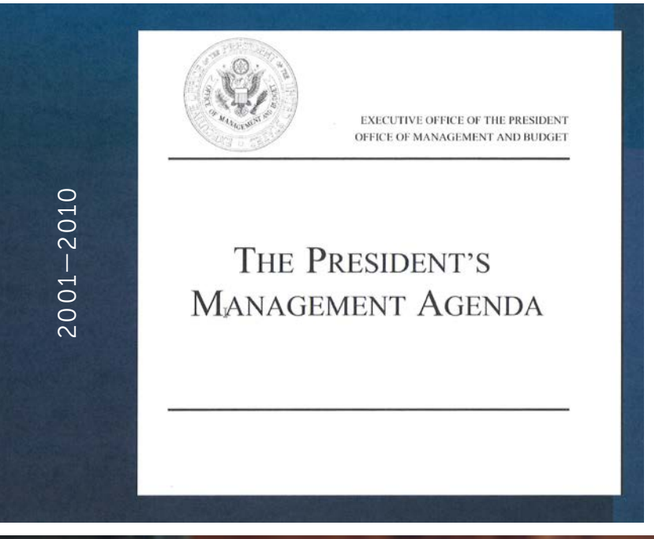
(b) An assessment center to identify qualified applicants for the Advanced Leadership Program,

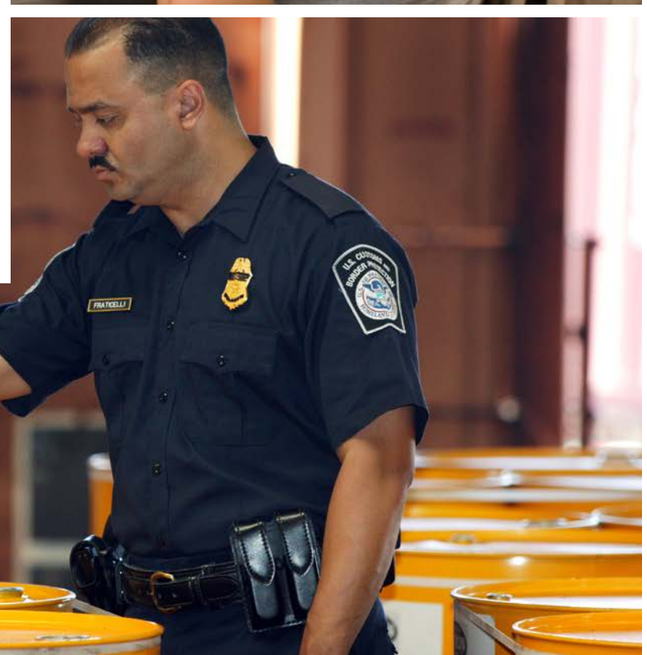
(c) A structured interview for applicants to the Leadership Development Program, and

(d) A structured interview for applicants to the Office of Human Resources Candidate Development Program.

The exercises and interview questions were pilot-tested and content validity ratings collected. HumRRO developed the processes for implementation, prepared all administrative materials, trained assessors and interviewers, scheduled candidates, facilitated the sessions and prepared score reports for applicants. Subsequently, HumRRO revised and implemented the assessment centers on multiple occasions.







EMPLOYEE & ORGANIZATIONAL DEVELOPMENT

OVER THE COURSE OF EIGHT YEARS from 2005 to 2013, HumRRO provided support to the Office of Personnel Management (OPM) to implement and evaluate the Strategic Human Capital Management Initiative, which was part of the President's Management Agenda introduced in 2001. HumRRO worked with OPM's Human Capital Program to:

(a) Review and evaluate all available strategic human capital plans and succession plans for agencies included on the President's Management Council,

(b) Identify metrics to include in the Program Assessment Rating Tool report to the Office of Management and Budget,

(c) Assist in the development of metrics for the Human Capital Accountability and Assessment Framework, and

(d) Provide support for new initiatives such as training on the metrics for those involved in implementing them.

Finally, HumRRO developed tools for agencies to use in evaluating leadership development programs, identify and use human capital analytics, evaluate recruitment and outreach activities, and perform personnel turnover analyses.

U.S. Customs and Border Patrol officers, compiled from 2004-2009. Public domain images via Wikimedia Commons.

The U.S. Customs Service created an Office of Training and Development (OTD) to improve the quality of training at every level within the agency. HumRRO was contracted to support OTD in:

(a) Developing a training infrastructure,

(b) Defining assessment standards and processes for training programs,

(c) Creating measures and processes for ongoing assessment of training being delivered,

(d) Making recommendations for an agency-wide training information system, and

(e) Implementing a career development framework.

A significant part of this effort involved conducting job analyses for several key positions, the results of which were matched to the curriculum in place at the time to identify gaps between training and skills required on the job and adjust entry-level courses as necessary.

Within the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), the Industry Operations Investigator (IOI) is one of three core occupations. HumRRO conducted a job analysis of the position by meeting with subject matter experts to identify tasks performed and the knowledge, skills, and abilities required to perform those tasks. Questionnaires were then developed to obtain input from job incumbents regarding the criticality of the tasks and the importance of the KSAs. The results were used to develop a comprehensive competency model which served as the foundation for a skills gap analysis. That analysis, in turn, was used to make recommendations regarding potential improvements to existing training.

HumRRO developed competency models for several job series within the Federal Bureau of Investigations (FBI). In one case the focus was on entry to first-level supervisor grade levels in three job series in the Intelligence Career Service. A job analysis study was conducted to identify

critical tasks and KSAOs, which was then used to develop a competency model and proficiency levels for each competency at each grade level. Finally, HumRRO worked with subject matter experts to identify developmental opportunities which were categorized by type (e.g., educational program, self-directed study). A job analysis was also conducted for the Special Agent job series, the results of which also resulted in a competency model, as well as proficiency levels and behavioral indicators for each competency.

Two projects conducted for the Federal Aviation Administration (FAA) focused on issues related to air traffic controllers (ATCs). The first centered on the extent to which shift work patterns and rotation practices contributed to fatigue amongst the workforce. A questionnaire comprising items and scales used in previous shift work studies was administered to all of the nearly 25,000 individuals associated with air traffic control in the FAA. Data gathered on shift work schedules and sleep patterns were correlated with information collected on physical, psychological, and social outcomes as well as job performance questions. Results of the survey data, including content analyses of open-ended responses, were presented to a Scientific Steering Group and ATC union representatives. A feedback report was provided to study participants, including recommendations for coping mechanisms.

English is the standard language used in international air traffic control. A central issue that arose in the late 1990s was what level of proficiency in English is needed for safe operations. To address this concern, HumRRO established a minimum level of proficiency based on an ATC task analysis, speech samples from oral proficiency interviews of Latin American controllers, taped ATC-pilot communications under routine conditions, and ATC language samples during operational errors. HumRRO then conducted an analysis of the training time required for students to attain the target level of speaking ability and listening comprehension. Researchers reviewed proficiency measures and recommended criteria to be used in selecting a measure for use within the ATC population. Additional work was carried out to set cut scores for minimum English proficiency levels.

During this period, HumRRO continued its work supporting the Metropolitan Washington Airports Authority. This included:

(a) Developing instructional programs,

(b) Reviewing human resource systems and procedures to identify adjustments needed to ensure compliance with applicable laws and regulations as well as potential improvements, and

(c) Examining recruitment, selection, compensation, and retention programs and policies to identify potential improvements based on current best practices.

HumRRO also conducted a compensation study for the Administrative Office of the U.S. Courts focused on the Defender Services Program which is key to ensuring that the Sixth Amendment right to counsel is upheld. Federal statute and Judicial Conference policy requires pay parity between Federal Defender Organization (FDO) and U.S. Attorney Office (USAO) personnel. It is essential that prosecutors and defenders are on a similar pay scale if FDO is to attract and retain competent staff. HumRRO conducted job analyses of 29 FDO jobs using interviews and focus groups. Comparisons were then carried out between FDO and USAO compensation levels and benefits. HumRRO identified alternative policies to enable greater consistency between the two organizations as well as changes and updates to the compensation system for FDOs.

Starting in 2004 and continuing for the next five years, HumRRO conducted an evaluation of the Defense Leadership and Management Program (DLAMP). Established in 1997, the goal of DLAMP was to ensure long-term civilian executive leadership in the Department of Defense (DoD) by providing promising civilian employees with a joint perspective on managing DoD's workforce and its various programs. The curriculum involves completion of a master's degree, graduate courses in business management and public policy, attendance at leadership seminars, and courses in national security studies and leadership. After conducting a literature review on best practices in leadership development and succession planning, HumRRO designed an integrated program evaluation strategy. This involved pre- and post-DLAMP participant surveys assessing expectations and reactions. HumRRO also did a comprehensive analysis of projected vacancies within the department and the background, experiences, and qualifications needed to fill those vacancies. In 2009, DLAMP was replaced by the Defense Senior Leadership Development Program (DSLDP) and, as described in the next chapter, HumRRO evaluation work continued.

The Occupational Information Network (O*NET) is a comprehensive conceptual framework designed to serve as the foundation for a variety of human resource programs, such as school curriculum development, job placement, and training. The National O*NET Consortium's National Center for O*NET Development collected occupational data for over 900 occupations for the seven domains of the O*NET Content Model (e.g., abilities, interests, work context, work values). HumRRO's involvement with this work began in 2000 and included developing procedures and materials for collecting and analyzing the needed information and creating an orientation program for users along with users' guides. The data were then collected from trained analysts as well as job incumbents. Write-in responses were used to identify new and emerging task statements to be included in the occupational task lists. Given the changing nature of the world of work, the data collection and analysis process continues on an on-going basis to ensure information provided to O*NET users is current.



Air traffic controllers, 2003. Public release photo from the National Archives Catalog.

CHAPTER 6

CERTIFICATION

DURING THIS PERIOD, HumRRO continued its long relationship with a number of certification clients, including the Association of Legal Administrators and the Society for Human Resource Management. Work in this area also continued to expand. As mentioned previously, when HumRRO acquired PMES several existing contracts continued. One of these was with the California Architects Board supporting their licensure examination. In order to obtain a license to practice in California, a candidate must pass not only the national examination but also the California Supplemental Examination (CSE), which is an oral exam. The work included exam development, standard setting, administration support for six testing windows each year, analysis of results, and developing score reports for examinees.

The Veterans Benefits Administration (VBA) became the focus of increased attention in the 1990s as complaints grew regarding inaccurate claims decisions, slow processing times, and a variety of other issues. In response, VBA decided to institute a system which would ensure that individuals in various positions had the requisite knowledge to efficiently and effectively carry out their work. In 2001 HumRRO began working with the VBA to develop and validate a Skills Certification Instrument for Veterans Service Representatives (VSRs) in the Compensation and Pension line of business. This work included conducting job analyses, developing test blueprints, directing subject matter experts in writing test items, and developing support materials for test administrators, supervisors, and candidates. In 2007, the original project was extended to cover three additional jobs. Given advances in technology, these tests were delivered online and included not only traditional multiple-choice items, but also multiple response, stem completion, and short essay questions. In 2008, Congress passed the Veterans Benefits Improvement









Act which required VBA to provide for an examination of appropriate employees and managers who are responsible for processing claims for compensation and pension. As a result, VBA extended skills certification to include Supervisory Service Representatives and Decision Review Officers. HumRRO worked with VBA to develop the mandated testing processes and procedures.

The Federation of State Board of Physical Therapy (FSBPT) develops and administers the licensure testing program for Physical Therapists (PT) and Physical Therapist Assistants (PTA). The exam is administered in all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands. In 2006, HumRRO conducted a practice analysis to support the updating of examinations using methods that were a significant departure from previous FSBPT practice analyses. Working with three distinct oversight groups formed after consultation with FSBPT, staff reviewed relevant background information, interviewed incumbents, and conducted workshops with subject matter experts to generate lists of tasks and associated knowledge requirements. Separate work activities and knowledge surveys were developed for each position and administered to a representative sample of PTs and PTAs. HumRRO recommended ways to lessen the burden on respondents, conduct sampling to ensure representativeness, and measures to take to increase response rates. Analyses were run to examine differences among segments of the sample (e.g., based on years of experience) and assess interrater agreement. Results were presented to a working group who participated in a blueprint weighting exercise as well a task in which they linked knowledge and task statements. A policy oversight panel reviewed the revised test blueprints and made changes for clarity. The final test blueprint content and category weights represented a substantial revision from previous versions that would be more transparent to users and be more durable over time.

Other certification clients HumRRO worked with over this period included the Girl Scouts of the USA, the American College of Periodontology, the American College of Health Care Executives, and the American Board of Independent Medical Examiners.

Public release photos from the National Archives Catalog, compiled between 2001-2007.



MILITARY SELECTION, CLASSIFICATION, AND RETENTION

THE ARMY LAUNCHED the Foreign Language Recruiting Initiative (FLRI) in the early 2000s under the premise that the ASVAB does not measure the true aptitude of non-native English speakers. The program was open to applicants who score in the Category IVA range on the Armed Forces Qualification Test, which is the 21st to 30th percentile. HumRRO first investigated alternative measures that could be used to assess the abilities of such individuals and identified the Spanish version of the Wonderlic Personnel Test as a candidate. Applicants who scored above a chosen cut-off point were sent to English-as-a-Second Language (ESL) training, and those who passed the post-enlistment version of the ASVAB were admitted to service. FLRI was pilot tested between 2002 and 2003 and showed promising results. In 2006, HumRRO was asked to evaluate language-neutral tests so that the program could be opened to individuals with other native tongues. Based on the results of research done, the Assembling Objects test from the ASVAB was selected as the initial screen. HumRRO continued program evaluation efforts through 2010 and made recommendations for improvements and enhancements based on the results.

Each year, the United States Army enlists thousands of new recruits to perform the many jobs required to successfully complete the organization's mission. Significant numbers of these individuals leave the Army prior to completing their terms of service, many within the first few months after joining. These premature separations represent a significant loss on investment to the Army as costs incurred to recruit, outfit, transport, and train these soldiers are never regained in the form of their performing critical Army jobs. In a multi-year effort conducted for ARI, HumRRO administered surveys to new recruits as they entered training, upon completion of training, and annual surveys thereafter for five years. Individuals who exited service before completing their term were also surveyed. These data were merged with Army personnel and training files to create an integrated database to explore causes and correlates of attrition along with strategies to manage it. Associated efforts included interviewing drill sergeants and obtaining critical incidents that occurred between them and soldiers that made a difference in whether the soldier stayed in the Army. Much of the effort was replicated in 2003 to explore the possibility that differences in the cohorts might limit the generalizability of the initial findings. The final report included detailed models of the factors that are related to attrition at various times in a soldier's career and recommendations for actions that can be taken to forestall this outcome.

The 2002 Army Training and Leader Development Panel (ATLDP) called for objective performance assessment and self-assessment of soldier technical and leadership skills to meet emerging and divergent Future Force requirements. As recounted in an earlier chapter, HumRRO researchers were heavily involved in the development of the Skill Qualification Test program in the 1970s which involved administering hands-on and job-knowledge tests to soldiers throughout the course of their careers. However, these were found to require excessive resources and were discontinued in the early 1990s. Under contract to ARI, HumRRO conducted a multi-phase effort to address the ATLDP's mandate in a way that would be viable in the long run. The first step was to identify potential issues and develop a rapid prototype assessment covering Army-wide core content and associated test delivery and test preparation materials. The envisioned program would be web-based and delivered through the Army's existing computer infrastructure. HumRRO pilot tested the exam, developed prototype assessments for five occupations, and refined recommendations for moving forward. All activities,

including a cost-benefit analysis conducted by subcontractors, were documented in a series of reports. Ultimately the program was not adopted because it was deemed too costly despite the cost-savings aspect of its design.

In a separate but related series of projects commencing in 2005 and known as Army Class, HumRRO conducted a future-force oriented job analysis of all Army occupations to identify:

(a) Clusters of Army occupations as they were projected to exist in the next 25 years,

(b) The job/task demands specific to those job clusters, and

(c) The KSAs needed to perform the work.

Researchers also recommended the KSAs for measurement and validation as predictors of performance in future enlisted jobs. The future-oriented job analysis involved document reviews along with interviews and focus groups. Predictor measures initially developed included a situational judgment test, two temperament inventories, a work preferences/values inventory, an interest measure, and two psychomotor tests. Assessment and criterion data were collected at various points in time over the course of several years and analyses were carried out examining the incremental validity of the experimental predictor measures over the ASVAB, the potential of the predictors to improve classification into MOS, and other aspects of test functioning. In 2010, the Tailored Adaptive Personality Assessment System was introduced as an additional measure. HumRRO then developed recommendations for an Initial Operational Test and Evaluation of the best-bet experimental pre-enlistment measures in response to an immediate need expressed by Army policymakers. This was initiated in 2009 and will be described in the next chapter. All work was documented in both technical and non-technical reports for dissemination to a broad military audience.

In the late 2000s, the U.S. Army Officer Candidate School (OCS) was expanded in response to requirements to increase the size of the Army. This necessitated greater use of an alternative avenue for entry into OCS, namely the enlistment-option program, in which civilians with college degrees are recruited to enter OCS after completion of basic training. HumRRO developed and validated a predictor battery for identifying OCS applicants with the most leadership potential, the best fit with the Army, and the greatest likelihood of staying in the Army. The Officer Background and Experience Form (OBEF) was administered to 1,344 OCS candidates in 10 OCS classes. The core measures included:

1. A variant of the Rational Biodata Inventory (RBI), a biographical instrument measuring temperament
2. A set of work values/preferences items
3. A situational judgment test

The OBEF was validated against several criterion measures and data from administrative files. Validity results pointed to a number of OBEF measures that could predict candidate commitment, Regular Army career intentions, and OCS performance beyond the ASVAB in an operational setting.

In a related effort, HumRRO undertook an effort with ARI to address the promotion system for Non-Commissioned Officers (NCOs), a critical component of an effective personnel management system for the future NCO corps. Researchers identified a set of critical 21st century NCO KSAs for two time periods (2000-2010 and 2010-2015) based on a projected set of future job demands. Next, the team developed several predictor measures, including a situational judgment test, a semi-structured interview, and a self-report of relevant experiences and activities. Additional predictors included two temperament measures previously developed for the Army, a pre-enlistment cognitive ability score, and a self-report form that allowed construction of a proxy-promotion points score under the

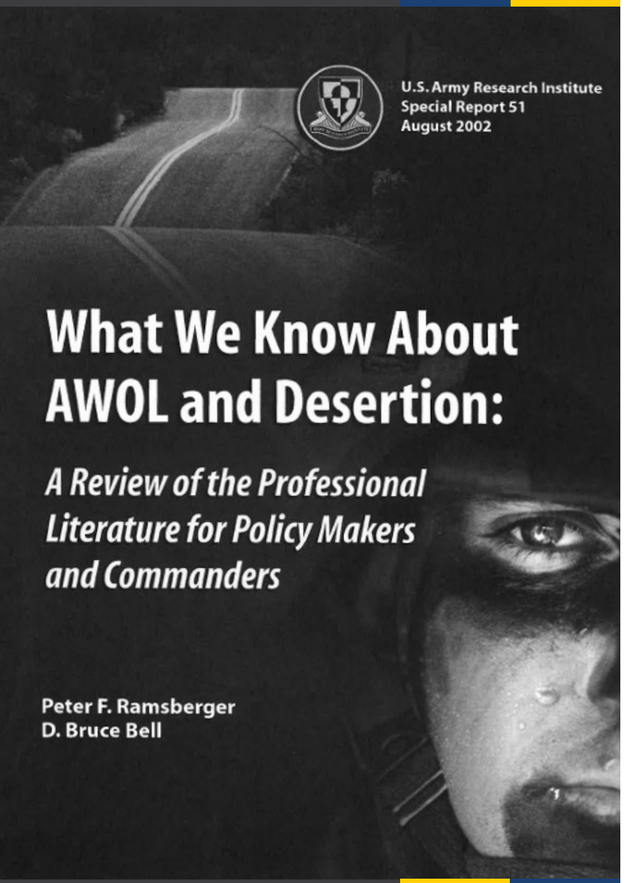


U.S. Marine Corps officer candidates participate in Small Unit Leader Evaluation II at Officers Candidate School aboard MCB Quantico, 2009. Public domain photo via the Digital Visual Information Distribution System (DVIDS).

existing NCO promotion system. Two supervisory rating scales were also created, one rating current performance and the other expected performance under specific futuristic scenarios. Researchers then collected predictor and criterion data from soldiers at seven Army installations. Small, but significant changes were made to the NCO promotion point system as a result of this research.

The Reserve Officer Training Corps (ROTC) is an essential commissioning source for the U.S. Army, producing approximately 70% of the Army's new officers. Qualified high school seniors or current college students can apply for 2-, 3-, or 4-year college scholarships. Data indicated that four-year scholarship cadets were less likely to complete their ROTC program and become commissioned officers than were those accessed through other avenues (e.g., U.S. Military Academy, Officer Candidate School). For this reason, the U.S. Army Cadet Command needed valid reliable measures to use in awarding scholarships to individuals who are most likely to complete their programs. ARI contracted with HumRRO to examine this problem and investigate possible remedies. The outcome of this effort was the Cadet Background and Experiences Form (CBEF). Over the course of several years, HumRRO coordinated data collections, analyzed longitudinal results, and made recommendations for refining the instrument. The CBEF is now incorporated into the process for identifying ROTC scholarship awardees.

The Personnel Testing Division was set up in 1989 to be the central source for managing DoD-wide personnel assessment efforts. Since that time, it has evolved into the Defense Testing and Assessment Center (DTAC) within the Office of People Analytics. In 2005, HumRRO was awarded a contract to assemble a panel of experts in the areas of personnel selection, job placement, psychometrics, and cognitive psychology to review the ASVAB and make recommendations for modernization and enhancement of the enlisted testing program. The group met six times over a 15-month period and made a total of 22 recommendations which were then prioritized in terms of feasibility and potential impact. Subsequent contracts were awarded to implement the recommendations, including developing a test of cyber knowledge and aptitude and devising a methodology to inform ASVAB content specifications from military job analysis and training curriculum information.



OTHER MILITARY WORK

SINCE THE ADVENT OF THE ALL-VOLUNTEER FORCE in the mid 1970s, issues surrounding recruiting and retention have taken a forefront in military personnel planning. HumRRO conducted a number of studies in this area during this period, including:

- Evaluating the process through which applicants for military service who have pre-service criminal behavior (e.g., misdemeanor and felony arrests or convictions) and/or a history of drug or alcohol usage are granted waivers for entrance. Researchers analyzed data on the pre-service behaviors of recruits in conjunction with information on outcomes such as attrition, promotion, and disciplinary actions. Recommendations were made for adjusting current practices that would either lower thresholds for individuals with past histories that do not appear to increase risk for negative outcomes or increase standards to more carefully screen those whose past behavior places them at greater risk.
- Examining the impact of multiple deployments on the reenlistment decision. HumRRO analyzed data from multiple sources and determined that **(a)** the number of deployments had a small effect on soldier retention, **(b)** soldiers with combat deployments cite the effect of Army experiences on family as a factor motivating them to leave, and **(c)** various incentives motivate soldiers with combat deployments to remain in service, including increased pay and guaranteed station of choice.
- Collecting data from individuals who were returned from Absent without Leave (AWOL) status to determine the reasons behind this action and possible mitigating actions that could be taken to prevent this outcome.



As mentioned earlier, with the advent of the All-Volunteer Force in the mid 1970s, recruiting became a major focus for DoD and the services. To assist in this endeavor, an ongoing research effort was undertaken called the Youth Attitude Tracking Study (YATS). Through YATS a nationally representative sample of 10,000 young men and women were asked about their future plans, including whether they were considering military service, what military attributes were appealing as well as those that made the military unattractive, and how current events affected their inclination to serve. In 2000, DoD discontinued YATS because, as an annual survey, it was not responsive to the immediate needs of the services. It was replaced with quick turn-around polls of both youth and the adults who influence them to capture data on transitory attitudes that may be influenced by current events. This information facilitated the design of effective recruitment advertising and the establishment of attractive incentives. From 2005 through 2006, and then again from 2008 to 2010, HumRRO conducted the Youth and Influencer Polls in the spring and fall of each year. Data were gathered through computer-assisted telephone interviews. HumRRO delivered weighted data files along with reports summarizing the results and analyzing trends over time. Following the 2009 polls, DoD decided to employ a new methodology for collecting propensity data, and the polls were discontinued.

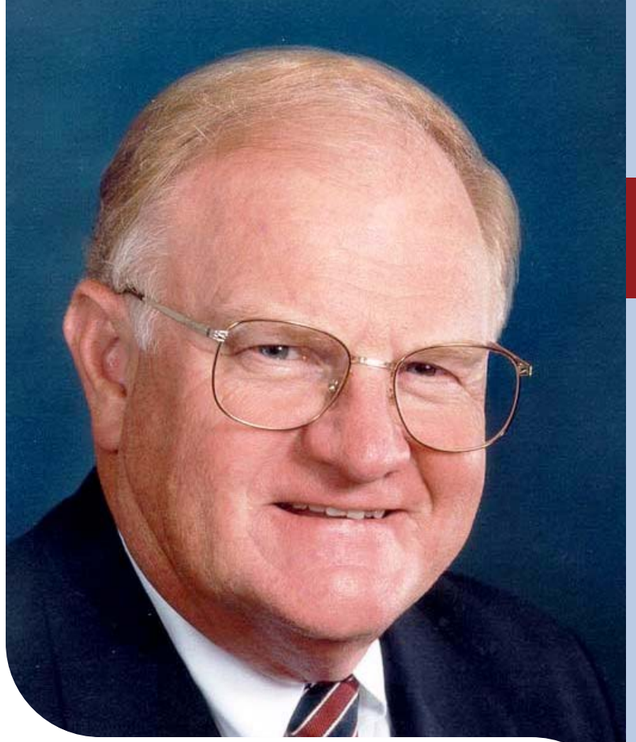
Throughout this decade, HumRRO held contracts with the ARI's Fort Knox office to support training research and development efforts for Active and Reserve Component soldiers and units in combined arms organizations. Some of the efforts HumRRO and its subcontractors completed during this period included:

- Designing and developing the Commanders' Integrated Training Tool for the Close Combat Tactical Trainer, a system of armored vehicle manned-module simulators and workstations that allows units to train collective armor and infantry tasks at the platoon through battalion task force level.
- Development of a comprehensive prototype training program for command group members that focused on the capabilities and limitations of unmanned sensors that would play a major role in the Army's Future Force objective to "See First." The program laid out a structured, logical sequence for developing skills and knowledge and included the use of "gates" (i.e., performance demonstration that trainees must accomplish before proceeding to the next segment of training).
- In recognition that training would be an essential element to the implementation of Future Combat Systems, ARI initiated work to identify training management issues in the training of Future Force soldiers, leaders, and units and to design a detailed approach to address those issues, with a focus on management of adaptive training. Researchers conducted literature reviews, interviewed leaders and decision-makers, and facilitated the contributions of a panel of experts to identify and prioritize the issues and requirements. HumRRO then delineated the design features of a training approach that clarified requirements for Future Combat System and training designers.

SURVEY RESEARCH

HumRRO's CENTER FOR SURVEY RESEARCH continued to support MDRC by conducting surveys and interviews to evaluate programs designed to help individuals with a history of difficulty finding and/or keeping steady employment. The reasons behind those difficulties varied by the four areas in which the efforts were undertaken, and included having been incarcerated, being welfare recipients, and suffering from clinical depression. Data collection methods included in-person interviews and self-administered surveys. In two cases, children of those entered into the program were also interviewed and/or surveyed. Response rates across the sites ranged from 69% to 86%. Researchers created a codebook for each questionnaire, scored the child assessment measures, and created and delivered final datasets to the sponsor. This first study was conducted 15 to 18 months after individuals had been entered into programs. A 36-month follow-up was also conducted at three of the sites using the same methodology.

HumRRO conducted two surveys for the Modern Language Association of America (MLA). In one case the target population was chairs of English and modern language departments at four-year degree-granting postsecondary institutions in the United States and Canada. The interest was in collecting information about the search process for hiring new faculty members. The methodology called for a web-based survey with a paper questionnaire follow-up. Researchers drew the sample from a database provided by MLA, processed all mailings (e.g., advance letter and reminders), keyed data from the paper-based survey, and delivered a final database. A second study for MLA sought information about the tenure process at departments of modern languages at universities across the United States. The survey was administered online, with sample members contacted via email. HumRRO programmed the survey, sent announcements and reminders, and assembled and delivered a final database.



For a private sector company, HumRRO administered surveys to patients and doctors designed to assess the impact of treatment options for two different conditions. In both cases, this entailed administering surveys to physicians and patients either via the mail or online. In one study the questionnaires were administered at the start of the study and at three- and six-month intervals. Tracking databases were created to assess completion status and send reminders as needed. Data from paper-based surveys were keyed and verified. Follow-ups were also implemented to obtain essential missing information. Preliminary, interim, and final data files were delivered to the client along with all necessary documentation.

HumRRO NOTABLES

CHARLES L. "JACK" McKAY

HumRRO CFO & Board Member

JACK McKAY earned his B.S. degree in financial management from Benjamin Franklin University, which is now part of George Washington University. His first professional position was with the American Psychological Association (APA) where he started as a junior accountant in 1964. He left that job to serve in the U.S. Air Force with the Strategic Air Command from 1968 through 1971 and then returned to APA as a senior accountant. By 1983, he was deputy executive officer for business and communications.

In 1983, APA's board of directors voted to purchase *Psychology Today* magazine. An APA spokesman is cited in an article in the *New York Times* as stating that the acquisition fulfilled a longtime dream of the association to have a consumer publication. However, according to that same article, the 15-year-old periodical had experienced drops in advertising revenue for about five years, with circulation decreasing from a high of 1,750,000 to 850,000. These facts were not lost on Jack, who strongly opposed the purchase. When the sale was approved by the APA board, Jack was asked to leave.

Meanwhile, Bill Smith, HumRRO's CFO, informed president Jim Singleton that he intended to retire in January of 1985. Recognizing that it would be advantageous to have a lengthy overlap between Bill and his successor, Jack was offered a position as Director of Business Affairs and Assistant Treasurer starting in July of 1983, an offer that he accepted. It was understood from the start that he would assume the position of CFO upon Bill's retirement.

For the first six months of his tenure, Jack was under Smith's supervision. But in January of 1984, Bill moved to the president's office taking the title of Vice President and Treasurer. Then, as promised, Smith retired in January of 1985 and Jack was named Vice President, Treasurer, and Director of Business Affairs.

Meanwhile, APA's board was slowly coming to recognize something: Jack was right. *Psychology Today* was sapping the association's resources, costing more than $17 million by the time they managed to sell it in 1988. The incoming CEO of APA sought to get Jack to return, but he and his family were reluctant to do so given the manner in which he had been treated a few years earlier. In the end, however, after numerous phone calls and dinners, Jack agreed to return as Vice President and Chief Financial Officer. Over his tenure with APA Jack was able to restore the association to financial stability. He secured partnerships that allowed for the construction of the APA headquarters building as well as a second building nearby. By the time of his retirement in 2009, APA had a budget of about $112 million.

But the return to APA did not mark the end of Jack's association with HumRRO. He retained his position as CEO for over a year in a leave without pay status as the company sought to regain its financial footing. Jack's extraordinary business leadership and creativity kept HumRRO financially viable during this era of instability. He was elected to the Board of Trustees in 1990 and served as a member until his retirement in 2019. It is safe to say that without Jack's financial acumen and business sense, there is a strong possibility that HumRRO would not have survived, let alone thrived, over the decades since his arrival at our doors.



HumRRO THROUGH THE DECADES





CHAPTER 7.



2011–2020



2011–2020





CONTRACTION & EXPANSION

ON JANUARY 1, 2011, HumRRO had 110 employees. Over the course of the next five years, this number gradually declined. It fell below 100 in 2013, reaching a low of 88 in December of 2015.[1] One of the primary challenges associated with this was the reluctance of insurance companies to provide coverage given higher administrative costs when a smaller number of employees are involved. HumRRO has always prided itself on offering a generous benefits package and working with a broker that tradition continued through this period. Relief started to come in late 2016 as the staff size grew to 100, and continued as the company had nearly 160 employees by the end of 2020.

HumRRO's financial condition fluctuated a good deal over the course of this period as well. Some of this was normal and expected, due to such factors as a change in administration which typically includes a slow down in allocation of funds while new priorities are set. There were also several periods when the stock market experienced large losses which had an impact on HumRRO's long-term investments. Yet another factor was the need to negotiate a settlement with the landlord of the office space occupied by the Center for Survey Research after it closed. An agreement was reached, but it resulted in a large hit for the company. Nonetheless, in the 2019-2020 Biennial Report it was noted that "Fiscal Years 2019 and 2020 were financially sound for HumRRO. Our bottom line totaled over $8 million for the two years and thus pushed our unrestricted net assets to over $24 million—the highest in company history."

To mark HumRRO's 60th birthday, a reception was held on August 12, 2011 at the headquarters building. Staff in Kentucky acknowledged the event with a picnic, and Minneapolis employees attended a Minnesota Lynx game. The occasion was also noted as part of the All-HumRRO conference held that year with displays of historical documentation and lunchtime presentations on significant projects from each decade of the company's existence.

In 2012, a call came from one of HumRRO's more important clients seeking documentation on any and all data that HumRRO may have collected on their behalf. In many cases retaining these data was required by contract terms (e.g., keep completed paper surveys for *x* years). This led to an effort to comb through some 1,200 boxes of materials that the company maintained in an off-site, secure storage facility. As staff members sorted through the contents of the boxes, many items were identified as potentially having historical significance related to HumRRO. These were returned to headquarters for review by a senior staff member and those that were deemed worthwhile were cataloged and combined with records left by Dr. Crawford upon his retirement. The resulting archives contains thousands of documents, including every report issued by the company from its founding through the mid-1970s.

Also in 2012, the Board of Trustees approved the allocation of funds to begin a Business Development Division within HumRRO for a trial period of four years. Prior attempts to have an individual assigned the role of marketing the company had not been successful, at least in part because the person(s) assigned that role were not as well steeped in the full range of the services the company could provide as were those actually doing the work. Therefore, their effectiveness was limited. This meant that the task fell to senior researchers within HumRRO who were expected to identify opportunities and write proposals in addition to their project work. Although this had been largely effective over time, it was also a heavy burden and potential sources of sponsorship were undoubtedly overlooked.

[1] *When informed that HumRRO had around 100 employees, an employee of a major firm that was subcontracting to HumRRO at the time commented, "You make a lot of noise for a company of your size."*

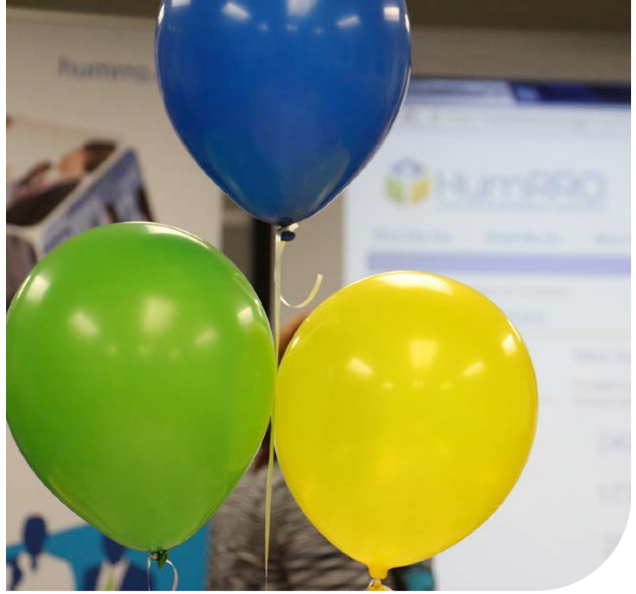
Under the plan adopted, employees within HumRRO would focus on business development as a part-time pursuit, with half of their time covered to do so. Further, they would be assigned an area that was within their scope of expertise, including military, education, private sector, federal civilian, and credentialing. A current HumRRO vice president was named to head the new division. Startup activities included receiving business development training, researching methods for tracking information on opportunities, and developing processes for tracking those opportunities through the various stages of decision-making and action. Methods were also generated to identify the outcomes of their efforts so the Board of Trustees could evaluate whether the venture should continue to be funded.

The Defense Base Realignment and Closure Act of 1990 provided for a commission of nine members appointed by the president to determine where cost savings could be realized by consolidating DoD assets. In May 2005, the commission presented its recommendations to the Secretary of Defense which included moving the Army's Armor School and Center from Fort Knox to Fort Benning, Georgia. HumRRO's presence at Fort Knox had been almost continuous since it's founding in 1951, first through the Armor Human Resource Unit and subsequently through support contracts that were recompeted on a regular basis. The last of those contracts ended in January of 2010, although HumRRO personnel were still active at Fort Knox through a subcontract with Northrop Grumman. However, with the Armor School's move to Ft. Benning in 2011, the group supporting those efforts largely disbanded, with some employees staying on in other roles.

Over time, HumRRO's branding remained relatively stable and sedate. In the early years given its status as an office within the Department of the Army, it was straightforward and somewhat stodgy. When the company was incorporated as an independent firm, changes were made to reflect that status, but the result was still quite conservative. As was mentioned in the chapter on the 1980s, a firm was hired at that time to provide direction on marketing, one result of which was a change in the letterhead and report covers that incorporated a rhombus, which the consultants deemed "forward looking." Another change came in 1997 when color was incorporated into the logo, and again several years later when an attempt was made to coordinate the look and feel of all products with a new marketing theme.

In 2013, an effort was launched to completely revamp HumRRO's "look." In part this was undertaken in acknowledgment of the fact that the company's client base had expanded far beyond what it had typically been over the years, including not only military and government entities, but also private firms and a wide variety of organizations offering certifications covering a host of occupations. Members of the leadership team worked closely with the business development directors and the graphics personnel to come up with several options which were presented to staff for their input. The new brand was officially launched on February 3, 2014 and over time migrated to all aspects of the company's products (e.g., reports, website).

During its June 2014 meeting, the HumRRO Board of Trustees authorized President Bill Strickland to contribute $25,000 to the University of Minnesota to help endow the **John P. Campbell Chair in Industrial and Organizational Psychology**. The endowment came on the occasion of John's retirement after 50 years on the Minnesota faculty, and in recognition of his long and distinguished service to both the field of I-O psychology and to HumRRO. John's association with the firm began in the early 1980s when he became a Principal Scientist, playing a central role in Project A. (See *Chapter 4*, **page 103**, for a description of this work.) The president of the University of Minnesota presented HumRRO with a Chancellors Society certificate expressing gratitude and appreciation for HumRRO's partnership with the university in commitment to improving lives through excellence in teaching, discovery, and outreach to the public.





HumRRO LAUNCHES **REBRAND**, 2014





HumRRO LAUNCHES **REBRAND**, 2014

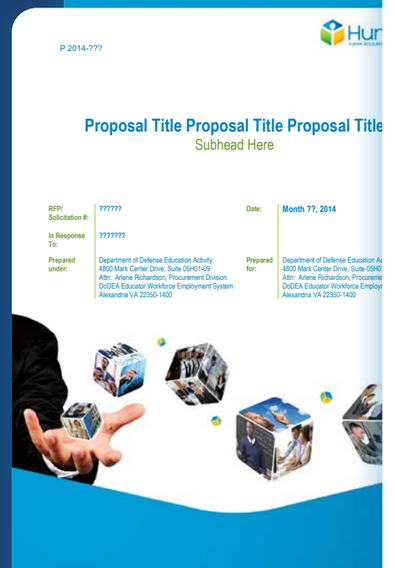


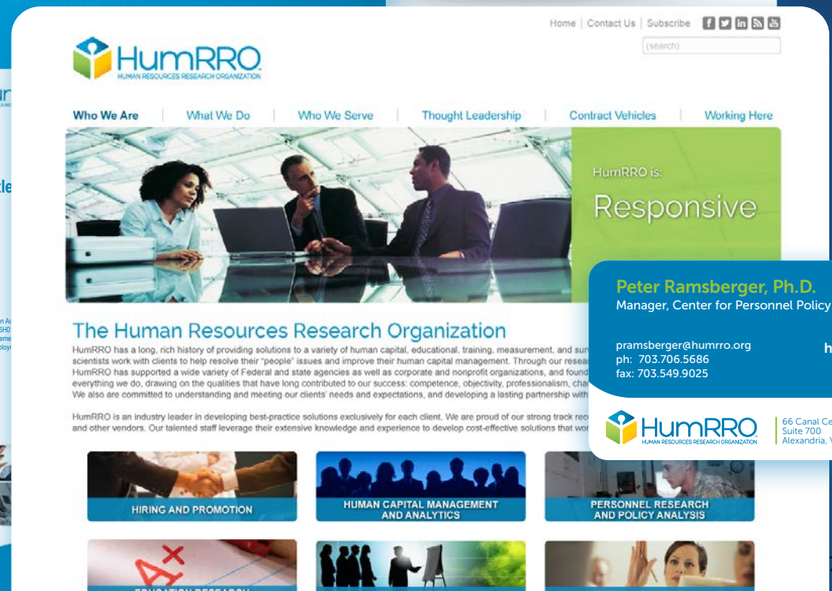
HumRRO
HUMAN RESOURCES RESEARCH ORGANIZATION



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HumRRO's work with the Metropolitan Washington Airports Authority (MWAA), cited in the previous two chapters, continued during this period. In some instances, there was a requirement to assess the physical requirements needed to successfully carry out a given job. In 2010, HumRRO also received a contract from the Transportation Security Administration (TSA) to update a job analysis previously done for the Transportation Security Officer (TSO) position. In the interim, TSA expanded the TSO job to enhance the career ladder for incumbents, adding Master and Expert TSO positions. This work also included a focus on the physical requirements for performing various duties. In both the MWAA and TSA cases, HumRRO worked with a subcontractor, Human Performance Systems (HPS), which was an industry leader in matching applicants to jobs based on their physical, cognitive, perceptual, and medical status. In fact, HPS performed job analyses of the TSO position in 2002 and 2004 focused on physical requirements.

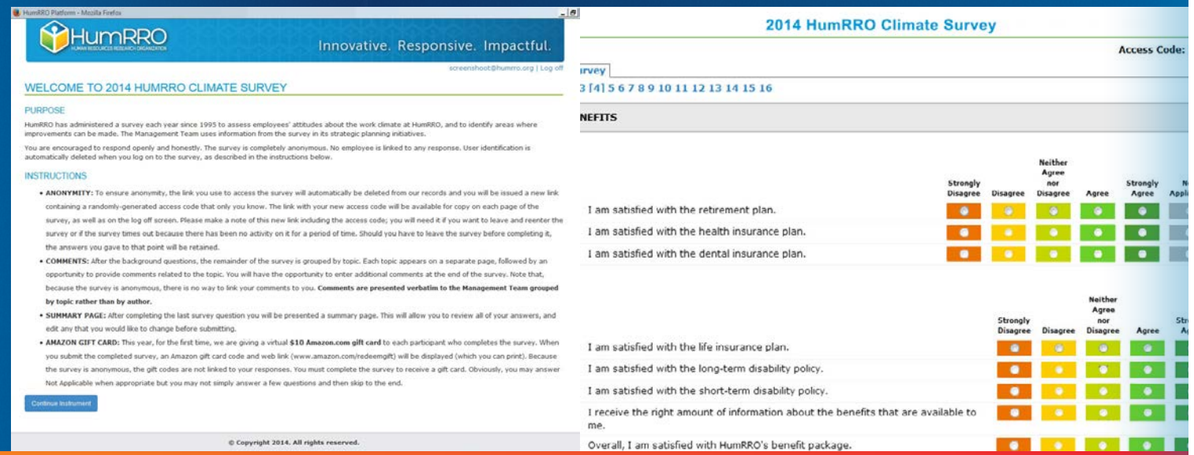
In 2015, discussions ensued between HumRRO and the founder of HPS, Dr. Deborah Gebhardt, about the possibility of HumRRO acquiring the company. She and her colleagues had strong reputations in the field and had amassed a major database of information about the physical requirements of a wide spectrum of occupations. Dr. Gebhardt wanted to find a way of preserving the legacy of HPS and ensure that the work would continue when she decided to retire. The acquisition was completed and effective July 31, 2015 HPS became part of HumRRO, including ongoing HPS contracts.

At the start of this period, HumRRO employed 12 computer specialists. In all, five of these individuals were charged with maintaining internal systems and assisting staff who were experiencing technical difficulties. An additional two programmers were charged with maintaining the company's website and supporting research projects that required some computer-based elements such as online surveys. Finally, there were five individuals whose focus was on programming and maintaining the ASVAB and other DoD-wide military selection and classification tests. By 2020, the number of IT specialists had grown to 32, with eight providing employee support, five focused on project support, and 19 devoted to online military testing.

One factor driving the growth of HumRRO's IT staff was the increased need from many clients for surveys and other online products designed to meet their specific goals. As is detailed in this chapter, many of the projects undertaken required surveys to be administered to obtain input from stakeholders on various programs or for job analysis purposes. For that reason, through the internal research and development program, HumRRO funded efforts to develop a survey platform and item banking system that could be made available to, and accessed by its customers. The platform is a collection of highly customizable modules that can be packaged together based on project needs and allows for quick and efficient creation and delivery of data collection instruments, including surveys, assessments, and personnel evaluation forms. Over time, HumRRO maintained item banks for many of its clients, including smaller certification and large employee selection programs.



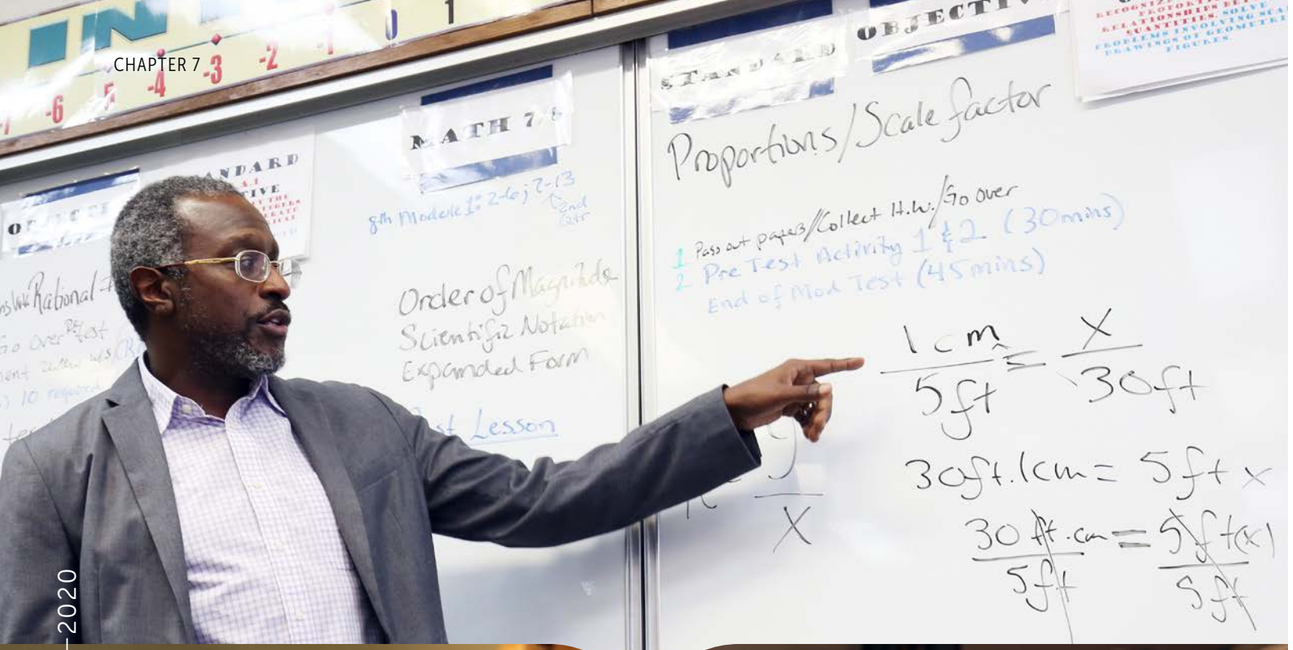
Suzanne Tsacoumis, 2011.

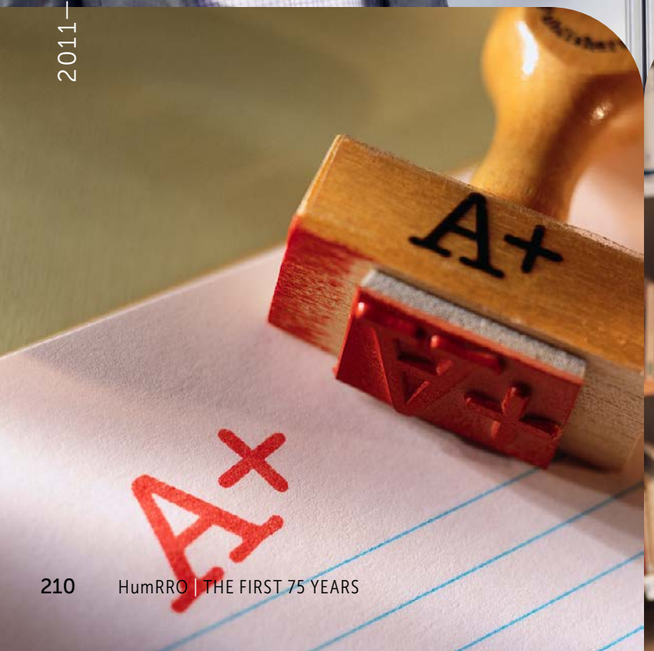


Bill Strickland made it known well in advance his intention to retire in July of 2018.. He had served as president for over 10 years and was looking forward to relocating to Texas to be near family. At its May 24, 2017, meeting, the Board of Trustees voted unanimously to offer the position of President and CEO to **Suzanne Tsacoumis**. She joined HumRRO in 1987 and had served as a researcher, project director, program manager, vice president for operations, and vice president for business development. In a memo concerning the selection process, Paul Sackett, Chairman of the Board, stated the following:

> *After extensive discussion, the Board concluded unanimously that Suzanne met all the qualifications we had established. Those qualifications included significant (and successful) management experience at the executive level, in a government contracting environment, and preferably in a non-profit organization. Further, we wanted someone known in an appropriate professional community, technically proficient in his or her own right, who embraces the scientist-practitioner model. Finally, we were looking for a strategic vision that is compatible with HumRRO's collegial culture. Given Suzanne's qualifications, and after discussion of specific identified potential external candidates, we chose to invest neither the time nor the resources to search beyond HumRRO for its next President. Accordingly, we offered that position to Suzanne, and she accepted our offer. Effective July 1, 2018, Suzanne will become HumRRO's seventh president.*

Suzanne continued in her role as Director of Business Development for the next year. As stated in the newsletter announcing this decision, in the interim she spent significant time "becoming familiar with all of the really fun parts of being the CEO—like staff benefits issues, retirement plan fiduciary duties, IRS and Labor issues, audits and subcontracting plans, acquisition regulations, and the various specialty attorneys we turn to for advice."

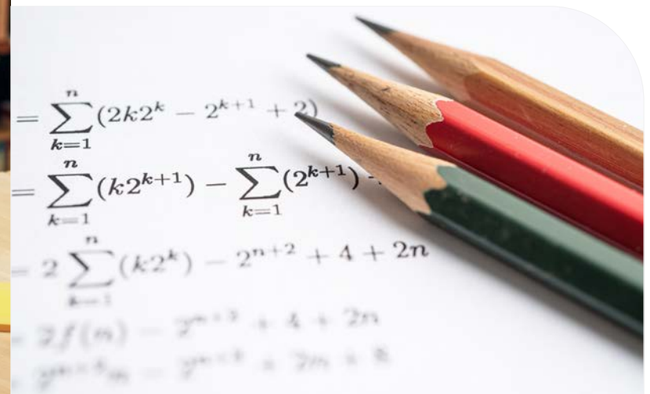






EDUCATION

WITH THE PASSAGE OF THE NO CHILD LEFT BEHIND ACT in 2002, states began instituting assessment systems allowing them to report on the progress, or lack thereof, their students were making in meeting standards in various subjects. Frequently, testing companies would be hired to work with state and local educators to develop and administer the tests in question. Given the importance of the results at the student, district, and state level, the testing vendors, or in some instances the states, require quality assurance processes to ensure that the data have been properly assembled and analyzed. HumRRO frequently took on this quality assurance role during this period. Depending on the state/vendor involved, this entailed reproducing Item Response Theory (IRT) results, constructing raw-score to scale-score conversion tables, equating results across testing years, assigning performance levels, conducting data forensics to investigate anomalies found, and providing guidance to address issues raised (e.g., impact of shortening tests). This work was often done under tight deadlines, with researchers putting in long hours so outcomes could be reported on a timely basis. The states for whom this work was performed included Michigan, Pennsylvania, Oklahoma, Indiana, New York, Florida, and Arizona.



Much of HumRRO's work in the education arena during this period consisted of conducting studies to assess the degree to which assessment or intervention programs were operating as intended and having the desired impact. The work with the National Center for Education Statistics serving as the quality assurance contractor for the National Assessment of Educational Progress (NAEP) continued, including monitoring processes and procedures to ensure conformity to standards, conducting site visits to observe operations, and undertaking in-depth studies to identify potential improvements in those operations. From 2011 to 2018, HumRRO staff produced over 30 reports documenting the results of their work.

The National Assessment Governing Board (NAGB) is an independent group of experts who set policy for the NAEP. In 2013 HumRRO was awarded a contract from the NAGB to conduct a multi-method evaluation of the 12th grade NAEP reading and mathematics frameworks and item pools as a measure of preparedness for job training. Three distinct investigations were undertaken. In the first, a panel of 48 educators from 13 states was assembled to determine the content alignment between NAEP and WorkKeys, assessments developed by ACT to measure readiness for work in 12 areas. The second study identified NAEP content that is relevant to training performance requirements for each of five target occupations based on data from the Occupational Information Network (O*NET). The final study involved assembling a panel of experts in industrial-organizational psychology and educational measurement to consider the results achieved in the previous work and provide ideas for future investigations. Overall, the conclusion reached was that NAEP measures reading and math content that is broader and at a higher level than the reading and math knowledge skills and abilities required for entry level job training, and therefore performance on the test may not be a valid indicator of preparedness for job training.

During this timeframe, HumRRO continued to serve as the independent evaluator for the California High School Exit Exam (CAHSEE). Staff analyzed passing rates for each administration, evaluated test forms for alignment to the California Content Standards, monitored item and test development, and tracked trends in key outcomes such as drop-out and graduation rates. They also conducted special studies including surveying students, local education agency (LEA) staff, and middle school teachers to obtain input on the exam and analyzing differences between higher-effective and lower-effective LEAs to gain insight into variations in practices that might be related to differential outcomes.

With the introduction of the Common Core Standards in English language arts and mathematics in 2009, two consortia of states formed to jointly develop tests that address those standards. California joined the Smarter Balanced consortium. In 2015 students began taking the Smarter Balance assessments, with high school students also required to take the CAHSEE. A bill was passed by the California senate in 2016 that removed CAHSEE as a graduation requirement for the 2015-2016 school year, as well as the two following. In 2017, the CAHSEE program was ended completely.

The California Assessment of Student Performance and Progress (CAASPP; formerly known as the Measurement of Academic Performance and Progress) was established in 2014. It has several components, including the Smarter Balanced Summative Assessments and the California Science Tests. As with CAHSEE, the program required an independent evaluation to provide objective technical advice and consultation on activities to be undertaken in implementing the CAASPP System. HumRRO was awarded a contract to serve in this role in 2015 and continued to do so through 2020. Over the course of this time, researchers conducted eight studies focused on various aspects of CAASPP, including test alignment with state content standards, administration and scoring processes, and overall impact of the program. Various methodologies were employed, such as surveys, case studies, and site visits. Overall, eleven reports were produced, including two comprehensive final reports.

During this timeframe, HumRRO also served as the independent evaluator of Washington state's Statewide Improvement Initiatives, the state of New Hampshire's Performance Assessment of Competency Education (PACE) program, the South Carolina College-and Career-Ready Assessments, and the State of Texas Assessments of Academic Readiness. A variety of methodologies were used across these projects, including analysis of extant data, review of processes and procedures, interviews, and site visits. In all cases, strengths and weaknesses were identified and avenues for improvement recommended.

Under the Every Student Succeeds Act of 2015, all states are required to assess students annually in reading and math in grades 3-8 and once in high school. This led to a need to ensure that the assessments being implemented could be linked to a given state's educational standards. During this period, HumRRO performed a number of alignment studies, which typically involved assembling a panel of educators familiar with the standards adopted and having them review items from the state's test and make judgments regarding the degree to which those items assess the content specified in the standards and do so at the level intended. This process also identifies content that may not be adequately addressed and can lead to adjustments to the assessments to ensure they are accurately measuring what students are expected to learn. HumRRO performed such studies in Iowa, Kansas, Maine, Missouri, New York, Oklahoma, and Tennessee.

California's Commission on Teaching Credentialing requires all preliminary multiple- and single-subject teacher preparation programs to use a Commission-approved Teaching Performance Assessment (TPA) as one of the program completion requirements for prospective



teacher candidates. Three TPAs were approved by the Commission. In 2017, HumRRO was awarded a contract to accumulate as much evidence as possible to evaluate the comparability of those TPAs. Staff carried out seven activities to accomplish this goal, including evaluating extant documentation associated with each TPA, performing a content validity comparability analysis with experts, comparing scoring methods and rubrics, and analyzing score data across the models. In the end, they concluded that, while there were differences across the three models, those differences did not suggest that the outcomes resulting from their application are substantially different. Another project focusing on teacher accreditation was carried out for the Council for the Accreditation of Education Preparation (CAEP). In this instance, HumRRO staff prepared a research plan, including a theory of action to guide the study, and recruitment and data collection plans to address four questions (e.g., what is the impact of CAEP standards on the practices and policies of education preparation providers?).

During this period, HumRRO's relationship with a nationally recognized graduate entrance exam provider began. Work included conducting data forensics to identify suspicious test-taker behavior, developing an SJT to be administered as part of the exam, analyzing results of surveys administered to test takers, conducting item bank research and psychometric analyses, and providing general consulting on issues that arose over time.

Additional work in the education area carried out during this period included:

(a) The continuation of quality control, validation, and research studies for the Kentucky Department of Education (described in the previous chapter)

(b) A study carried out for the Rockefeller Philanthropy Advisors that applied a new methodology to evaluate the quality of common core assessments to a set of existing high school summative and end-of-course tests

(c) Contracts with a private sector firm to evaluate the impact on learning outcomes of assessments they offer to schools across the country





CIVILIAN SELECTION, CLASSIFICATION, AND PROMOTION

THE U.S. FOREIGN SERVICE consists of professionals carrying out U.S. foreign policy and aiding U.S. citizens abroad. They serve at diplomatic missions around the world, including embassies, consulates, and other facilities. Foreign Service Officers are selected through a rigorous series of written and oral examinations. As a first step in the process, applicants take the Foreign Service Officer Test (FSOT), which serves as a cornerstone of the selection process. The FSOT is delivered multiple times each year to thousands of applicants. In 2013, HumRRO was awarded the contract to oversee the development and delivery of the FSOT with Pearson Vue serving as a subcontractor to manage the application processing, candidate scheduling, and computer-based tests delivery.

HumRRO provides field test and scored test questions for each component of the FSOT, including various tests which have fluctuated over time (e.g., job knowledge test, English Expression test, Situational Judgment Test, essay prompts). HumRRO uses a multiple-stage process in item development, including content source identification (typically State Department publications), initial item development, peer review, revision, final review, bias and sensitivity review, and subject matter expert review. Researchers also provide analytic results regarding psychometric characteristics of the tests including group differences and reliability. All activities and outcomes are documented in annual reports provided to the State Department.

Intelligence analysts routinely face the daunting task of synthesizing information from a wide variety of sources, evaluating its veracity, and generating workable conclusions that are useful to policymakers and other government officials. For this reason, the Office of the Director of National Intelligence, through it's contractor the MITRE Corporation, initiated a pilot study of critical thinking proficiency to determine if a measure of this essential characteristic could be developed. As a subcontractor, HumRRO developed and validated such a measure for use in training and developmental activities. With input from intelligence community and MITRE staff, researchers created items to assess causal reasoning, hypothesis evaluation, logical reasoning, and asking the right questions. A pilot test was conducted and the items were found to exhibit strong psychometric characteristics, including reliability, wide range of difficulty, and theoretically expected relations with each other and with established cognitive tests also administered as part of the pilot. A second pilot test was conducted involving a larger sample, and the results were equally as encouraging. HumRRO provided the sponsors with guidance on collecting additional data from the target population and steps needed to maintain the test going forward.

The Department of Homeland Security contracted with a team led by Personnel Decisions Research Institute to design and develop a pre-employment selection program for early career and experienced cybersecurity professionals. As part of this work, HumRRO developed and validated 99 structured interview questions for early career, experienced, and people manager cyber professionals. The questions assessed non-technical constructs such as Continual Learning, Critical Analysis, and Customer Orientation, while the leadership capabilities included Executive Core Qualifications such as Leading Change and Resource Management. Researchers gathered information about each targeted competency, drafted initial questions, submitted those questions for subject matter expert review, revised and piloted them, and content validated them through a retranslation exercise. HumRRO staff also developed eight technical capability simulations for selecting experienced cyber professionals. These assessed a range of domains such as threat analysis and vulnerability assessment. After multiple rounds of pilot testing and SME review, workshops were conducted with DHS personnel to determine the scoring standards to differentiate various levels of expertise. Finally, HumRRO developed eight advanced technical interviews to accompany the technical capability assessments. A literature review indicated that four performance areas distinguish between full-performance and expert performance. Interview questions were generated targeting these areas, which were reviewed by SMEs, pilot tested, and revised as necessary. HumRRO staff also drafted interview guides, applicant guides, and interview training materials.

In 2012, the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), in response to fiscal concerns, decided to replace the grade 14 promotional system which HumRRO developed (as described in the previous chapter) with a computer-based process called the Electronic Promotion Assessment Process (EPAS). HumRRO partnered with HR Avatar to create interactive, rich-media assessments to measure the critical competencies required to perform successfully as a grade 14 field agent. The battery included a virtual role play, a situational judgment test, and an in-basket. All assessments used animation and various interactive features to provide an engaging test experience for the candidate. The assessments were delivered on HumRRO's test delivery platform in proctored settings. HumRRO conducted a criterion-related validity study, and the results from that work and operational administrations were used for item pruning. HumRRO also produced feedback reports for all candidates and decision makers. In subsequent work, staff developed alternate versions of the EPAS, which were subject to criterion-related validation and equated with one another.

In another project conducted in conjunction with HR Avatar, HumRRO developed an animated, realistic job preview (RJP) for the International Association of Chiefs of Police (IACP). The goal was to help IACP attract individuals to police work who may not have considered it before,

and do so by fostering realistic expectations about all the profession requires. The RJP is made up of high quality, cost-effective "cinematics" that portray typical entry-level law enforcement activities, with an emphasis on community service-oriented aspects of the job in addition to traditional enforcement aspects.

Starting in 2012, HumRRO staff worked with a private sector firm to refine and enhance the selection system for one of their more critical and visible positions. Staff created an online, engaging, standardized assessment that measured several KSAs essential to that job, including a virtual role play, an animated situational judgment test, and a self-report biodata measure. Researchers developed performance evaluation tools to support a criterion-related validity study, as well as report templates to provide decision makers information about individual job candidates. Additional work involved developing tools to ensure that evaluators make consistent, accurate, and reliable judgments when assessing individuals at various points in the selection process. These include behaviorally anchored rating scales to guide evaluators in observing specific behaviors that reflect core KSAs and calibrate judgments across different evaluators.

Southern California Edison (SCE) is one of the nation's largest electric utilities, providing power to millions of people across central, coastal, and southern California. Given the size of SCE's workforce, employee selection and promotion processes are essential to fulfilling its mission. SCE contracted with HumRRO to support various human resources functions, including hiring, employee/leadership development, and general consulting support. In one effort, HumRRO researchers performed market research to identify commercial off-the-shelf (COTS) leadership assessments. This involved reviewing SCE's leadership competency model and collecting information from several vendors about their products by conducting structured interviews with representatives and reviewing technical documentation. SCE decided to conduct a criterion-related validation study that included two assessments favorably reviewed by HumRRO. Researchers collected data to determine if the measures were appropriate for high-stakes decision-making at five leadership levels. The findings led SCE to select one of the two for operational use. HumRRO then conducted additional research to determine whether the measure could be validly applied to additional job series. In another project for SEC, HumRRO reviewed and updated selection tests for five apprenticeship positions by conducting workshops with SMEs, pilot testing the updated assessments, and conducting additional workshops to set cut scores.

The Port Authority of New York and New Jersey Police Department (PAPD) is responsible for performing security and law enforcement duties for transportation facilities in the New York/New Jersey metropolitan area. To help ensure their police officers are capable of effectively performing job tasks, PAPD contracted with HumRRO to develop and validate legally defensible entry-level physical tests and medical guidelines. HumRRO conducted a job analysis to identify essential tasks, working conditions, and required physical abilities for the police officer job. The results were used to develop/select physical tests which were completed by a sample of PAPD training academy recruits along with criterion measures. The result was a valid physical test battery and data to support the establishment of cut scores. HumRRO also reviewed psychological assessment procedures and made recommendations for adjustments to improve the process.

During this period, HumRRO consulted with a wide variety of other clients regarding physical/medical screening processes for personnel selection, including Colorado Springs firemen and policemen, Westchester County corrections officers, San Francisco policemen, and Minneapolis fire cadets.







EMPLOYEE & ORGANIZATIONAL DEVELOPMENT

HumRRO'S WORK with the Occupational Information Network (O*NET) continued during this period. Among the activities undertaken was a project to determine whether job incumbents or analysts should provide skill information in future data collections. This involved conducting analyses of ratings within each group and across groups for 807 occupations. In another effort, researchers sought to identify occupations that may be confused with target occupations, but are actually quite different. HumRRO also developed Occupational Ability Profiles for those interested in determining if their personal ability profile is a good fit with a given occupation. This involved nine dimensions, including verbal ability, arithmetic reasoning, spatial ability, and motor coordination. Finally, researchers updated the system's "Related Occupations" framework by identifying which occupations shared the most work and worker-oriented characteristics.

The Defense Senior Leader Development Program (DSLDP) is designed to prepare high performing GS 14 and 15 civilian leaders to address complex policy and operational issues faced by the Department in today's national security arena. The 2-year program was announced in 2008, with the initial class beginning in February 2009. Given the purpose of DSLDP and its visibility within the Department, HumRRO was asked to conduct a comprehensive evaluation of the program. The first step was to identify the questions to be addressed given the DSLDP's objectives (e.g., Are the best candidates being nominated and selected? Do attendees experience growth in assignments, roles, and responsibilities?). This was followed by identifying the most cost-effective way to answer those questions. HumRRO conducted a workforce analysis along with surveys and interviews of participants and stakeholders. Researchers also implemented critical incidents-based and multi-rater assessments to track participant progress throughout the program. The first-year results led to modifications to the DSLDP as well as refinements to the evaluation strategy. Overall the results indicated that the program was having the desired impact on both participants and the Department.

The National Intelligence Strategy called for better integration and collaboration among the agencies that comprise the U.S. Intelligence Community and emphasized the key role that human capital and training reforms play in the transformation. One element in this effort was the development and implementation of a multi-source (e.g., supervisor, subordinate, peer) feedback and evaluation system as a key mechanism through which culture change, enhanced performance and collaboration within the community can be enhanced and maintained over time. Beginning in late 2007, HumRRO conducted a 360-degree "proof of concept" for the Office of the Director of National Intelligence (ODNI) working with top management. Researchers developed an interview protocol and provided consultation to the presidential appointee who conducted the interviews. HumRRO personnel conducted the interviews with DNI's leadership team, created written feedback reports, and met with each target to discuss the results. Subsequently, HumRRO developed a survey-based 360-degree feedback tool for broader use, pilot tested the instrument, met regularly with key representatives from various agencies throughout the process, and created training materials to help individuals from those agencies implement and maintain the system. Feedback on the process was overwhelmingly positive and the aggregate results provided a snapshot of the strengths and developmental needs of the senior leader workforce. HumRRO provided facilitators to meet with senior-most leaders from each agency to provide feedback. In subsequent work, HumRRO conducted organizational development and coaching work for ODNI's Chief Human Capital Officer, including conducting interview-based 360-degree feedback reviews for team members, executive team coaching, and developing and facilitating a series of offsite team-building workshops.

In response to mandates included in the 2010 National Defense Authorization Act, the Defense Civilian Personnel Advisory Service (DCPAS) took the lead in creating a DoD-wide training program and development opportunities aimed at potential aspiring leaders and early career supervisors. HumRRO, in collaboration with HR Avatar, developed several assessments to measure civilian leadership competencies at different levels of leadership. One assessment battery was intended for use in selecting new supervisors, while the others were to help current supervisors at different levels of experience in developing and improving their leadership skills. The assessments included video- and scenario-based role play exercises and situational judgment tests, self-reports of leadership motivation and engagements, and supervisor reports of critical competencies such as written and oral communication. In each case, the participant received feedback based on their scores. Once a participant completed the battery, their competency-based scores were automatically computed based on their responses across the different assessments and they were provided a feedback report via email. The report provided details on strengths and weaknesses and areas for development.

HumRRO continued working with the Metropolitan Washington Airports Authority (MWAA) during this period by conducting compensation studies to determine comparability of pay for various positions with other entities, performing job evaluations, conducting focus groups to evaluate their performance management system, and studying work processes and staffing levels.

CERTIFICATION

THE SOCIETY FOR HUMAN RESOURCE MANAGEMENT

(SHRM) has two competency-based certifications that serve as the global standard in HR credentials: SHRM Certified Professional (SHRM-CP) and SHRM Senior Certified Professional (SHRM-SCP). To determine candidates' level of HR knowledge and behavioral competency, SHRM uses exams that feature both knowledge-based and situational judgment (SJT) items. Through a Master Services Agreement, HumRRO worked with SHRM to maintain their certification exams, as well as perform analysis and research in support of the overall testing program. Working with subject matter experts, HumRRO facilitated the creation of new knowledge and SJT items, including conducting bias and sensitivity reviews. HumRRO also provided item banking services, assembled new test forms on a regular basis, conducted operational score monitoring and score reporting, and facilitated standard setting meetings. Researchers also conducted analyses of operational data to determine the effect of speededness on testing outcomes and investigated the possibility of employing different response options for the SJTs (e.g., best option, best/worst option).

The National Conference of Bar Examiners (NCBE) is a not-for-profit corporation that develops licensing tests for bar admission along with testing, educational, and research services to jurisdictions. In 2017, NCBE launched a multi-year effort to plan the bar exam of the future. HumRRO assisted in this process by developing a multi-method research plan to maximize the likelihood that any changes to current practices would be well received by stakeholders and could be implemented with minimal disruption. Researchers facilitated a focus group to explore emerging topics and trends in practice for newly licensed lawyers. A pre-meeting survey was administered to participants to gather initial thoughts, reveal preliminary themes, and plan for follow-up questions. The results of the focus group were used to aid in planning a new job analysis and inform NCBE's research efforts.

The Association of Social Work Boards (ASWB) maintains four examinations that are administered to thousands of candidates each year. In 2013, ASWB contracted with HumRRO to help guide and evaluate the work of their testing support vendor by reviewing the vendor's project plans and deliverables (e.g., data analyses, score reports, annual technical reports). HumRRO also advised ASWB about developments in testing that might be pertinent to social work. In May 2015, HumRRO undertook a comprehensive analysis of social work practice to update the content of the examinations. This involved meeting with subject matter experts to update existing lists of activities performed by social workers, and the knowledge required to perform those activities. HumRRO then created a web-based survey to gather input from an international sample of social workers. The results were used to update the test blueprint and category weights.

The HR Certification Institute (HRCI) was interested in obtaining data regarding the value of two of its more popular certifications (Professional in Human Resources® and Senior Professional in Human Resources®) to individuals who obtain them and the entities for which they work. HumRRO began by selecting outcomes that an HR certification should impact, including employability, compensation, career satisfaction, and job performance. Researchers then developed a survey to gather information from HR professionals or their supervisors about each outcome. The research design included certificants and non-certificants drawn from HRCI databases. The survey was administered online and each participant who took part was asked to provide contact information for their immediate supervisor. In the end the sample included over 10,000 HR professionals and over 1,500 supervisors. Multiple regression analyses were used, controlling for variables that might be related to target outcomes. Results showed that HR certification was positively related to six different outcomes, including employability, compensation, career satisfaction, job performance, HR expertise, and future potential. Outcomes were documented in a white paper and briefing slides, and HumRRO personnel helped describe the study during a webinar offered to a wide audience of HR professionals.

HumRRO conducted a similar study for the Board of Certification for Emergency Nursing, which also suggested positive outcomes for achieving certification (e.g., high pay, employability, career satisfaction). Also during this period, HumRRO updated the practice analysis for the Federation of State Boards of Physical Therapy described in the previous chapter and provided support to a variety of other certifying organizations including the National Automated Clearinghouse, the Investments and Wealth Institute, the American Academy of Periodontology, the American College of Healthcare Executives, and the American College of Health Care Administrators.









2011—2020



Officer Candidate School (OCS) candidates practice navigation skills as part of their professional education, 2019. Public domain photo via the Digital Visual Information Distribution System (DVIDS).

MILITARY SELECTION, CLASSIFICATION

THE TAILORED ADAPTIVE PERSONALITY ASSESSMENT SYSTEM (TAPAS) was originally developed through a small business innovation research grant issued by the Army Research Institute for the Behavioral and Social Sciences to Drasgow Research Group. TAPAS consists of pools of statements descriptive of various facets of temperament. Multidimensional items are created by pairing statements of comparable social desirability from different facet pools. Respondents indicate which of the two statements is "most like me." Although there are static forms, TAPAS is designed to be administered adaptively such that items are created and administered in real time depending on responses to prior items. TAPAS was originally created to measure up to 22 lower order facets of personality underlying the Big Five factor model. Additional facets were subsequently introduced to predict outcomes of particular interest to the military (e.g., counterproductive work behavior).

On the basis of criterion-related validation research HumRRO conducted for ARI, Army policymakers decided to conduct an initial operational test and evaluation (IOT&E) of TAPAS. Army applicants started taking TAPAS in the spring of 2009. Testing was initially restricted to those with high school diplomas but then extended to most non-prior service applicants. Throughout this period, HumRRO tracked those who had joined the Army throughout their initial military training and through their Army careers. The computer-based criterion measures developed and administered with HumRRO's support included job knowledge tests, an attitudinal survey, and performance ratings provided by instructors (in training) and supervisors (in field units). Some criterion data were also obtained from archival sources (e.g., separation status, end-of-course grades). At 6-month intervals, HumRRO compiled the predictor and criterion data, conducted criterion-related validation and other analyses, and documented the results in briefings and written reports. The longitudinal dataset for this project was large and complex, with the final dataset including roughly 671,200 soldiers. Data were obtained from more than 10 sources and included over 8,000 variables.

During this period, HumRRO continued working with ARI to refine measures for selecting individuals for Officer Candidate School (OCS) who are likely to stay in the Army and perform well as leaders. HumRRO developed a revised Officer Background and Experience Form (OBEF), which included the TAPAS, a measure of individual temperament, and the Leader Knowledge test (LKT), a measure of implicit knowledge. Additional validation work confirmed the earlier results and also suggested other measures that were viable for creating a new OBEF-based predictor composite. New criterion measures were also developed for use when the sample reached branch-specific training. Researchers cross-validated the results from the second phase and developed the best-bet officer candidate selection composite for the OCS application population. Finally, longitudinal data were gathered for the Phase I cohort, including administrative data, a self-report survey of attitudes and self-reported performance, and performance ratings from each officer's direct supervisor. The overall pattern of results showed that the OBEF was predictive of key officer performance and continuance outcomes approximately three years after their time of commissioning.

In a related effort, also conducted for ARI, HumRRO used qualitative methods to:

(a) Identify how the OCS application and selection process works;

(b) Identify and describe OCS applicants in terms of their motivations, backgrounds, and incentives, and;

(c) Develop recommendations for improving the OCS application process.

Researchers conducted focus groups and one-on-one interviews with a variety of stakeholders that suggested several improvements to the application and accessioning process. HumRRO also developed and evaluated two realistic job previews, one for service members considering OCS and a second for individuals considering OCS as an option upon entry to service. The goal was to provide potential applicants with better information about the application process, curriculum, and key events (such as branch assignments) to facilitate better self-selection into OCS. The evaluation included having 142 officer candidates read the job previews and provide feedback, which was overwhelmingly positive.

In a series of projects for ARI, HumRRO staff sought to identify and validate selection tools for predicting Army officer performance that will identify individuals with the qualities necessary to perform well as junior officers, make the Army a career, and develop into effective senior officers. HumRRO first identified major duties performed by officers in key early- and mid-career levels, along with the skills, abilities and other characteristics (SAOs) required to perform those duties effectively. This was followed by an effort to isolate those SAOs that were not well measured in the existing officer selection system. HumRRO also developed and pilot tested a number of measures of officer performance, knowledge, career intentions, and attitudes towards the Army. They then used various techniques to investigate the validity of the measures. The results varied by rank, with the Fitness Motivation scale from a rational biodata inventory being the strongest predictor of overall performance for company grade officers, and the predictor battery as a whole a likely predictor of performance for those at higher levels.

In 2003, the focus of the mission of developing and employing unmanned aerial systems (UAS) changed from strategic intelligence, surveillance, and reconnaissance to tactical reconnaissance, surveillance, and target acquisition. This produced an increase requirement for coordination between manned and unmanned aerial systems. ARI's Infantry Forces Research Unit identified a need for understanding the specific skills required for such tasks and the most efficient way to train those skills. HumRRO began by reviewing available documentation to determine:

(a) The missions in which UAS operators would need to coordinate with helicopter pilots,

(b) The specific tasks required to perform those missions in which manned and unmanned systems would interact, and

(c) The teaming skills involved in conducting these tasks.

The results were confirmed in a set of workshops with UAS operators. Additional workshops were run to establish the criticality of the skills and elicit descriptions of performance indicators. The results of the study were relevant to identifying training needs, selecting training methods, and developing ways to assess performance of skills needed to coordinate missions involving manned and unmanned aircraft.

As mentioned in the previous chapter, in 2005 HumRRO was asked by the Personnel Testing Division (now the Defense Testing and Assessment Center) to assemble a panel of experts in personnel selection, job placement, psychometrics, and cognitive psychology to review the ASVAB testing program and make recommendations for modernization and enhancement. One of those recommendations was that a test of information-communications technology be developed given the increased importance of knowledge and skills in this area for military operations. Starting in 2007, under sponsorship by the Air Force, HumRRO personnel undertook this task. Researchers conducted a literature review of past efforts to develop measures in this arena, developed and piloted a prototype test, and validated the prototype against training school grades. Further validation work was undertaken by administering the test to applicants at Military Entrance Processing Stations and analyzing the resulting data. Work in this area continued throughout this decade, including item development, creation of new forms, expanding validation efforts to Army occupations, and performing standard setting and other psychometric services.

Other work performed in the military selection and classification realm during this period included developing a validity argument for the ASVAB as a tool for selecting individuals to serve in the U.S. Military. Researchers identified the battery's intended uses and assembled the evidence collected to date regarding whether it is valid for supporting those uses. Overall the findings were very positive, although suggestions were made for improvements that could be implemented. HumRRO also continued the work described in the previous chapter in which methods were developed and validated for selecting ROTC candidates.



Unmanned Aircraft Systems Operator discusses flight operations, 2018.



Students participate in Unmanned Aerial System Operations and Planning course, 2019.



Pictures from the first "Cross-Cultural Communication Competition" at Fort Bragg, North Carolina, 2012. One of the task scenarios involves correctly pack-loading a live donkey for travel (bottom right).





OTHER MILITARY R&D

THE ARMY OFFERS a variety of enlistment incentives to encourage applicants to choose Military Occupational Specialties (MOS) where the need is greatest. MOS incentive types, levels, amounts, and qualification criteria were determined by the Enlistment Incentive Review Board (EIRB). In the first phase of a study conducted for ARI, HumRRO personnel developed a Job Choice Model (JCM) based on actual applicant choice data along with a Decision Support Tool based on the JCM for predicting enlistments by MOS and associated cost given user-defined policy scenarios. This made it possible to predict the effects of policy changes on MOS fills and budget information. In the second phase of the study a forecasting capability was added to the Decision Support Tool so it could be used by the EIRB to allocate incentives to meet enlistment goals within budget constraints for future quarters. Finally, HumRRO staff worked with potential users to ensure the application was accepted and the user interface was responsive to their needs.

ARI's Fort Leavenworth Research Unit recognized that the requirements of Company Commanders were expanding to include making decisions that in the past were the purview of those at higher levels (e.g., negotiating with local authorities, collaborating with non-government organizations). In addition, company commanders often lead sizeable staffs in their command posts that had been at the battalion level or higher in the past. With this in mind, HumRRO partnered with ARI to conduct an assessment of company command competencies for the School for Command Preparation. In all, 29 focus groups were conducted with current and former Company Commanders, Battalion Commanders, Small Group Leader Instructors, Command Sergeants Majors, First Sergeants, and other senior non-commissioned officers. Through this work, 35 company command competencies were identified for successful performance. Instructors provided additional data (e.g., required proficiency levels for each competency, extent to which competencies should be fostered in pre-command training). The resulting Company Comment Competency Model delineated the command responsibilities, which can be used to identify gaps in pre-command courses and assess training effectiveness.

In recognition that cross-cultural competence (3C) is a critical 21st century skill, the Educational Testing Service, under contract to ARI, developed a 3C framework along with a system for assessing 3C-related skills and an assessment battery. To further advance this work, HumRRO, under subcontract to ETS, refined and finalized the sociocultural performance requirements and developed criterion instruments for a validation study (i.e., cross-cultural performance rating scales, cross-cultural experiences questionnaire). HumRRO also coordinated and staffed multiple data collection trips and developed a web-based platform for delivering and administering the battery.

The ASVAB is used to select individuals into enlisted service and classify them into military occupations. Other measures have been developed and validated over the years to supplement the ASVAB, including the TAPAS and individual service interest inventories. Although rigorous, large-scale research projects are conducted to evaluate these assessments, the criterion measures used are often service-specific and sometimes occupation specific, making it difficult to examine outcomes DoD wide. In recognition of this fact, HumRRO, under subcontract to Infoscitex Corporation, worked to identify outcome measures that could be applied across services to provide a common frame of reference. A panel of experts in military accession was formed to guide the work. HumRRO conducted an extensive literature review to identify job performance constructs, job attitudes, and organizational outcomes that are well grounded in research. Surveys were conducted to evaluate the resulting taxonomy and to determine the relevance and generalizability of the criterion constructs across first-term enlisted occupations in all military services. The





Soldier facilitates translation between the pharmacy team and Nicaraguan nationals while handing out prescribed medications to patients, 2016.

was followed by having a panel of SMEs representing each of the services rate the relevance and criticality of the constructs. The criterion taxonomy had three broad domains, while the job performance taxonomy included training and in-unit performance dimensions relevant to the first term of enlistment organized hierarchically in four performance categories. A database was developed including information on 228 criterion measures that have been used experimentally or operationally since 1980 and are relevant to first-term enlisted occupations. Research staff developed recommendations for a unified set of test evaluation criteria that can be used by all services. Additional work included adapting existing criterion instruments for cross-service use and developing a situational judgment test for measuring important criterion in the joint-service environment.

The history of military gender integration has been incremental and steady, culminating in the 2016 repeal of the 1994 Combat Exclusion Rule, resulting in thousands of jobs in Infantry, Armor, and Special Operations being made available to women. As with any major policy change, it was critical to monitor the impact and mitigate any risks created by the change. To that end, ARI had been collecting individual- and unit-level survey, interview, and focus group data prior to and following the 2016 repeal focused on unit morale and cohesion and other attitudinal markers. To support this work, HumRRO constructed and cleaned a single analysis database for all gender integration data and provided quantitative and qualitative data analysis support, including trend analyses. All efforts were documented in a comprehensive technical report.

In 2008, the Department of Defense approved implementation of a program entitled Military Accessions Vital to the National Interest (MAVNI). This resulted from a request from the Secretary of the Army to institute a pilot program to expand the military recruiting market to certain legal, non-immigrant aliens with critical foreign language skills or licensed health care professionals. HumRRO was asked by the Office of the Assistant Secretary of the Army to conduct a program evaluation of MAVNI. This was accomplished by performing qualitative analyses of information collected through interviews with key MAVNI stakeholders, developing and maintaining a database of longitudinal data on individuals with language skills, assessing the degree to which the program was meeting its goals in accessing needed personnel, and documenting the outcomes for those admitted through the program (e.g., retention, reenlistment) as compared to an appropriately defined group of soldiers accessed through normal procedures. All activities and outcomes were detailed in interim and final reports.

Especially since the advent of the All-Volunteer Force, a variety of efforts were undertaken to develop measures of non-cognitive attributes of military applicants to identify those most likely to succeed and complete at least one full term of service. In large part, these efforts failed because the measures developed were susceptible to socially desirable responding and coaching. The aforementioned TAPAS was seen as a solution to this problem in that it included forced-choice items made up of statements that have been rated as equally desirable. Given the increased visibility of TAPAS and its expanding use by the services, certain issues were raised by stakeholders as being of concern (e.g., evidence of low stability of test-retest scores over time). For this reason, HumRRO was asked to convene a panel of experts in testing, personality assessment, and psychometrics to examine the evidence collected to date and provide recommendations for moving forward. All deliberations and outcomes were documented in a final technical report.

As mentioned previously, HumRRO's support of the U.S. Army's Armor school continued through the early years of this period through a subcontract with Northrop Grumman Information Technologies. The work largely centered on the U.S. Army's Brigade Combat Team Modernization, an ensemble of ground and air systems linked by advanced battle command and communication systems. Among other things, HumRRO conduced front-end analyses to identify and prioritize an initial set of Training Support Packages (TSPs), developed those TSPs, reviewed U.S. Army doctrine products and created new doctrine manuals, and reviewed a simulation system to ensure it supported the operational objectives defined in the tasks and supporting TSPs.

HumRRO PRESIDENTS

WILLIAM J. "BILL" STRICKLAND



BILL STRICKLAND was born in Boston, Massachusetts and attended the Boston Latin School. He applied successfully to the Air Force Academy and graduated with a major in engineering management. Commissioned as a second lieutenant upon graduation, he then headed to Ohio State University where he completed a Master's degree in Industrial-Organizational (I-O) Psychology. He was next sent to Lackland Air Force Base in San Antonio, Texas where he spent 3 years managing the development of job knowledge tests for various Air Force career fields. He then returned to Ohio State where he earned his Ph.D. in I-O Psychology.

Then, it was back to San Antonio where his assignment was to oversee work being done to incorporate computer-based training systems into Air Force training programs. Following this, he returned to the Air Force Academy where he was assigned to the Office of Institutional Research. As Chief of Admissions and Graduate Research, his work focused on adjusting the Academy's admissions process to reduce attrition and increase the performance and retention of graduates. His next assignment was at the Pentagon where he managed Air Force personnel testing and DoD research on the Armed Services Vocational Aptitude Battery.

Bill's next stop was Salt Lake City, Utah where he was the recruiting commander for seven states from 1987-1990, followed by a return to San Antonio where he became the chief of market research for Air Force recruiting from 1990-1992. By this time, Bill had achieved the rank of colonel.

His next assignment was also in San Antonio as the director of Armstrong Laboratory which conducted research and development in manpower, personnel, technical training, flying training, and logistics. There he oversaw a $50 million dollar budget and a staff of 400 people.

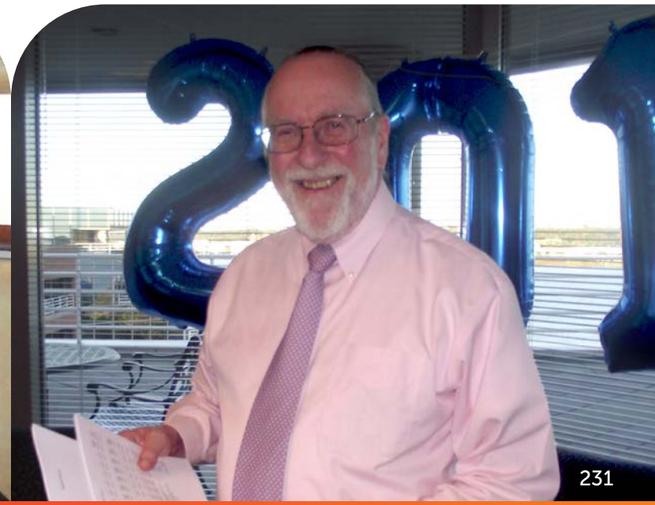
Following retirement from the Air Force, Bill spent a brief time as a principal analyst for a Navy contractor. In December 1996, one of HumRRO's vice presidents and a good friend of Bill's, Dickie Harris, died suddenly from an undetected heart issue. A committee was set up to review resumes to fill the position. The field was narrowed to eight candidates, four internal and four external. The committee conducted structured interviews with each, and they were asked to make a presentation to the company at large. In the end, Bill was selected for the job, which he gladly accepted.

When Bill became Vice President, he directed the Workforce Analysis and Training Systems Division that included several program areas, including the Advanced Distributed Training Program; the Modeling and Simulation Program; the Center for Survey Research; the Center for Learning, Evaluation, and Assessment Research; and the Center for Personnel Policy Analysis. In addition to his research and management responsibilities in these areas, he supported contracts with the Defense Manpower Data Center.

In 2007, Laurie Wise decided to step down as president, move back to Monterey, California, and take a position as Principal Scientist with HumRRO. On January 1, 2008, Bill became president of HumRRO. In addition to his role as president, Bill served on various posts within the American Psychological Association (APA), including the Policy and Planning Board of the Council of Representatives, and member-at-large on the Board of Directors. Bill also served the role of past president of APA's Division of Military Psychology. In addition, he served on several committees formed by the National Research Council, examining such issues as military advertising effectiveness and entrance standards. Bill achieved the distinction of fellow of both the APA and the Society of Industrial and Organizational Psychology.

Strickland served as president for ten years, before retiring on June 22, 2018. Over his tenure, Bill saw the company through some challenging times, but managed things with a steady hand.





CHAPTER 8.

2021 & BEYOND

2021 & BEYOND

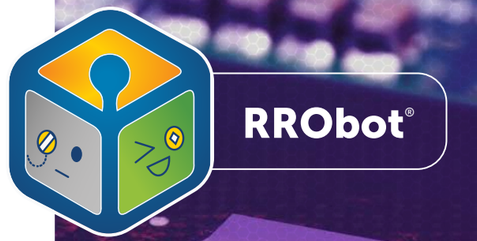
2021 & BEYOND

CONTINUED STABILITY, CONTINUED GROWTH

ON JANUARY 1, 2021, HumRRO had 160 employees. Over the course of the next five years, this number gradually grew, topping the 200 mark in January 2021, and increasing from there to a high of 259 in November of 2025. The makeup of the staff stayed reasonably consistent, with a slight decrease in management/administration (21% vs. 16%), and a slight increase in IT-related positions (20% vs. 24%).

Given the growth in the size of the staff and the increase in the degree to which technology is interwoven with the work HumRRO does, two new positions were added during this period. The first was a Vice President and Operations Director supporting the educational research and psychometric work which continued to expand as a central focus of HumRRO's work. The second was a Chief Technology Officer to implement a comprehensive strategy to meet the increasing IT demands of the company's internal operations and external clients.

Recognizing the likely impact that Artificial Intelligence (AI) would have on the way in which many of the functions HumRRO carries out for its clients can be performed, management decided to invest in the development of a secure, customizable AI platform which came to be called **RRObot®**. One of the key factors in its design and development was that it operate in a completely secure environment so that any client data that might be fed into the system would be protected. Several specialized applications were incorporated including a prompt generator that can be customized for specific tasks, and a batch processor that can handle large volumes of prompts with large numbers of variable inputs at scale. Once it was thoroughly tested and vetted, RRObot was put to immediate use by, among other things, automatically generating assessment items for personality and credentialing exams, developing matching algorithms to create military-civilian occupational crosswalks, and aligning vacancy descriptions with occupational frameworks. In all cases, HumRRO staff conferred with clients to explain how the tool would be used and obtained permission for its use. They also thoroughly reviewed the results generated to ensure accuracy. Work continues to expand RRObot's capabilities and capacity.







Like every other workplace in America, HumRRO was impacted by the Corona Virus pandemic. Offices remained open for those who wished to come in; all staff have private offices and safety protocols were put into place. Even so, most employees worked from home full time. However, with the many communications channels available, the work continued to get done. Suzanne Tsacoumis, HumRRO's president, started a series of "coffee chats," which allowed people to socialize and get to know a little about one another. In addition, HumRRO's social committee organized a variety of remote activities, including bingo sessions, happy hours, podcast club meetings, and yoga sessions. This was particularly crucial because HumRRO was in hiring mode, with over 30 new employees coming on board during the shutdown. Starting a new job in a completely remote environment can be disconcerting for some, so the opportunity to interact with others and find mutual interests was especially important.

If there was any bright side to this situation it was that the office space at headquarters was undergoing major renovations funded with a bonus the landlord provided for lengthening the lease on the space. In addition, the firm took over the remaining space on the 7th floor of building to accommodate the continued growth in staff size. The work was disruptive to say the least, but only the few employees who came to the office were inconvenienced.

Of course, the pandemic also had an impact on HumRRO's clients. In several instances selection and promotion testing programs that had traditionally been conducted in person were forced to find alternative methods given that their operational needs did not cease even with the shutdown. HumRRO staff worked with these clients to determine the most effective way to continue testing virtually. As might be expected, there were some hiccups along the way, but these led to improved methods and processes that met their needs.

The pandemic was at least partially responsible for another change at HumRRO. Although a work-from-home policy was already in place, it became more formalized and the number of employees choosing this option increased. In addition, whether a prospective employee lived in proximity to a HumRRO office reduced in importance. Particularly for more senior positions, if the individual was right for the job they were given serious consideration whatever their location. As a result, the number of full-time teleworkers increased, and is approximately 30% of staff at the present time.

Every change in presidential administration brings changes to which HumRRO's federal clients, and in turn HumRRO, have to adapt. Over time, this has typically manifested itself in shifts in funding that reflect the priorities of the new administration, and therefore the type of work HumRRO is asked to do.

Nevertheless, over this period, awards remained strong with annual revenues increasing each year. This allowed the company to continue providing a strong benefits package to employees as well as continuing to give back to society. In recognition of HumRRO's strong presence in the education arena, in 2024 a second fellowship was announced to complement that given since 1998 to candidates in I-O psychology. The **HumRRO Fellowship in Education Measurement and Evaluation** is awarded each year to a doctoral candidate in that field or a closely related discipline.

HumRRO also continued its relationship with the Urban Alliance, a national nonprofit organization dedicated to creating opportunities for young people through skills training, mentorship, and meaningful paid work experiences. Since 2019, HumRRO has offered a high school student internship through the program. They work 12 hours per week after school until graduation and then 32 hours per week through July. HumRRO pairs each student with a mentor based on their expressed interests, whether that be research, IT-related, or graphic arts.



Ulemjin "Uji" Tsolmonbaatar, HumRRO's 2025 Urban Alliance intern.





EDUCATION

DURING THIS TIMEFRAME, HumRRO researchers continued a number of the activities described in the previous chapter, including serving as the independent evaluator of the California Assessment of Student Performance Progress (CASSPP). HumRRO conducted case studies to investigate and evaluate how a small sample of schools were implementing the components of the CASSPP system, and performed two additional alignment studies for the English Language Proficiency Assessments for California. HumRRO's work with the Kentucky Department of Education also extended into this time period, with researchers performing third party psychometric checks of the Kentucky Summative Assessment results, developing and implementing a survey to measure student perceptions of school climate and safety, and creating a framework to support the validity of student- and school-level scores on the various accountability indicators and overall accountability ratings.

In 2021, the state of California legislature passed a bill that funded the California Community Schools Partnership Program (CCSPP). The intent was to promote schools' efforts to partner with local governments and community agencies to integrate programs that support students and allow them to succeed both in and out of school. HumRRO was awarded a contract to serve as the independent evaluator of the CCSPP. Researchers curated existing data sources such as grantee annual reports and school performance data. Additional data were collected through interviews and site visits. They also identified gaps in the data and tools available to assess community schools.

In 2022, the Alabama legislature passed the Alabama Numeracy Act (ANA) to address the urgent need to improve the math proficiency of Kindergarten through 5th grade students. The act included provisions to ensure that:

(a) Effective math coaches be identified and provided with the proper tools to help teachers improve math instruction,

(b) Effective curricular and instructional practices are implemented with fidelity,

(c) Student performance is monitored, and

(d) System adjustments are implemented based on clear evaluation data.

HumRRO and its subcontractor, Mathematica, were awarded a contract to perform that evaluation, including process and outcome components and targeted supplemental studies. Researchers conducted surveys and virtual and in-person focus groups with all stakeholders, including regional coordinators, local education agency staff, math coaches, principals, teachers, students, and parents. Student performance data were analyzed, and the results of all efforts were summarized in yearly reports, including recommendations for changes that could be implemented to heighten the effectiveness of the ANA.

The Alabama Rural Learning Accelerator (ARLA) was initiated to address difficulties in recruiting and retaining highly trained math and science teachers in rural areas of the state. The ARLA addressed this by pairing highly trained math and science teachers with local instructors in Alabama to mentor and teach students. STEM Innovations, LLC, with HumRRO serving as subcontractor, evaluated the program. HumRRO was responsible for conducting in-person focus groups with students who participated in the program as well as virtual focus groups with the teachers and administrators who took part in its implementation. The results of the work were included in the final report to the Alabama STEM Council, including recommendations for future improvements.









In 2022, Indiana Department of Education (IDOE) initiated an effort to apply best practices as defined through science of reading to ensure that 95% of third-grade students would be reading at or above grade level by 2027. Through the Literacy Cadre initiative, the IDOE provides:

(a) Professional development in science of reading,

(b) Curriculum procurement support, and

(c) Coaching in K-2 classrooms and assistance to teachers and school leaders from training support specialists and project managers.

IDOE contracted with HumRRO to provide a multi-year evaluation of this effort by collecting and analyzing data from schools on their progress in implementing the Literacy Cadre initiative, conducting virtual focus groups to gather data on the challenges and benefits related to the initiative, and preparing cumulative annual reports detailing the findings. HumRRO also provided recommendations regarding how resources should be directed, potential improvements to professional development programs, and other implementation enhancements.

In 2022, Florida implemented a Progress Monitoring (PM) system, under which statewide English Language Arts (ELA) assessments are administered to students three times a year in grades 3 through 10, with math assessments given in grades 3 through 8. The primary purpose is to measure students' achievement of Florida's educational standards and thereby support instruction and student learning. HumRRO was asked to independently review the PM system to address a variety of questions, including:

(a) Which of the three assessments to use as a passing score and indicator of readiness for matriculation or graduation,

(b) The feasibility of remote administration, and

(c) Evaluating the impact of the PM system on student learning growth data.

HumRRO analyzed data to address each of these questions and provided recommendations in a final report to the Florida Department of Education.

Colorado's statewide education accountability system includes standards and assessments along with a method for accrediting schools and districts primarily designed to:

(a) Provide valid and actionable information regarding the progress of all students toward meeting academic standards, and

(b) Prioritize support for schools and districts identified for improvement.

HumRRO was contracted to perform an evaluation of the system by analyzing state achievement and growth data, reviewing relevant documentation, and collecting data from key stakeholders using surveys, interviews, focus groups, and listening sessions. The results indicated that the performance measures used provide a reasonable and appropriate basis for objectively measuring the performance of districts and public schools. In addition, lower performing schools that participated in one or more of the intensive state-supported interventions designed to help participants implement research-based strategies for improving student outcomes generally experienced more gains and fewer losses in academic achievement than non-participating schools. Finally, while the results of the assessment system were used by teachers to at least some extent to provide targeted assistance to student groups, the results were less transparent, and therefore not helpful to parents in understanding how well their child is achieving academically.

With support from a U.S. Department of Education grant, in 2019 a collaborative effort involving a number of states and research organizations was undertaken to develop a new set of alternate English language assessments to better serve K-12 English Learners (ELs) with the most significant cognitive disabilities. The assessments were to be based on the Council of Chief School Officer's alternative English language proficiency (ELP) standards. HumRRO served as the independent evaluator for this effort. The central questions addressed by the evaluation were:

(a) Is the Alternate English language proficiency assessment (Alt EPLA) a valid and accurate assessment of ELs with the most significant cognitive disabilities,

(b) To what extent do state consortium partners have increased assessment literacy, and

(c) Is the assessment system developed from this grant sustainable over time.

In all cases, the findings were quite positive, and the assessments are now widely available.

HumRRO entered into a contract with a private firm that offers a variety of programs and resources for K-12 teachers and students, including diagnostics that pinpoint a student's learning gaps and measures growth over time, and learning modules that can be tailored to a student's level of subject matter knowledge. Various efforts were undertaken, including linking scores on the client's assessments with those achieved on several state assessments in various subjects and across multiple grades. Researchers also analyzed data to examine whether use of the resources is associated with obtaining higher scores on state assessments.

HumRRO served as an independent evaluator of several grants awarded by the U.S. Department of Education and the National Science Foundation. The purpose of the Competitive Grants for State Assessments (CGSA) program is to enhance the quality of assessment instruments and assessment systems used by States for measuring the academic achievement of elementary and secondary school students. The Kentucky Department of Education received a CGSA grant to develop a system that supports state and local co-creation of assessments. HumRRO's evaluation examined both interim and final outcomes of the grant activities by attending key meetings of project stakeholders and conducting interviews and focus groups with those stakeholders. HumRRO also served as the independent evaluator of two grants awarded by the National Science Foundation to the University of Kentucky College of Education. In one instance the focus of the work was on assessing the impact of efforts to shift the emphasis of undergraduate teacher preparation programs from mathematics teaching as a replication of school curriculum materials and activities to a focus on responsive mathematics teaching practices that are consistently informed by children's mathematical thinking. The results were used to enhance teacher education programs at colleges involved in the project as well as those at other universities. The second grant involved recruiting students to become STEM Education research fellows who, with the help of mentors, are exposed to important research focused on STEM teaching and learning. The goal is to inform national efforts towards developing future K-12 STEM educators who are able to implement research-confirmed pedagogical practices, conduct and respond to authentic research concerning their practice, and serve as agents of change concerning local school realities.

HumRRO researchers performed psychometric analyses of data from a state's testing programs to identify problematic cases, including:

(a) The number of times a student changed their answer from wrong to right,

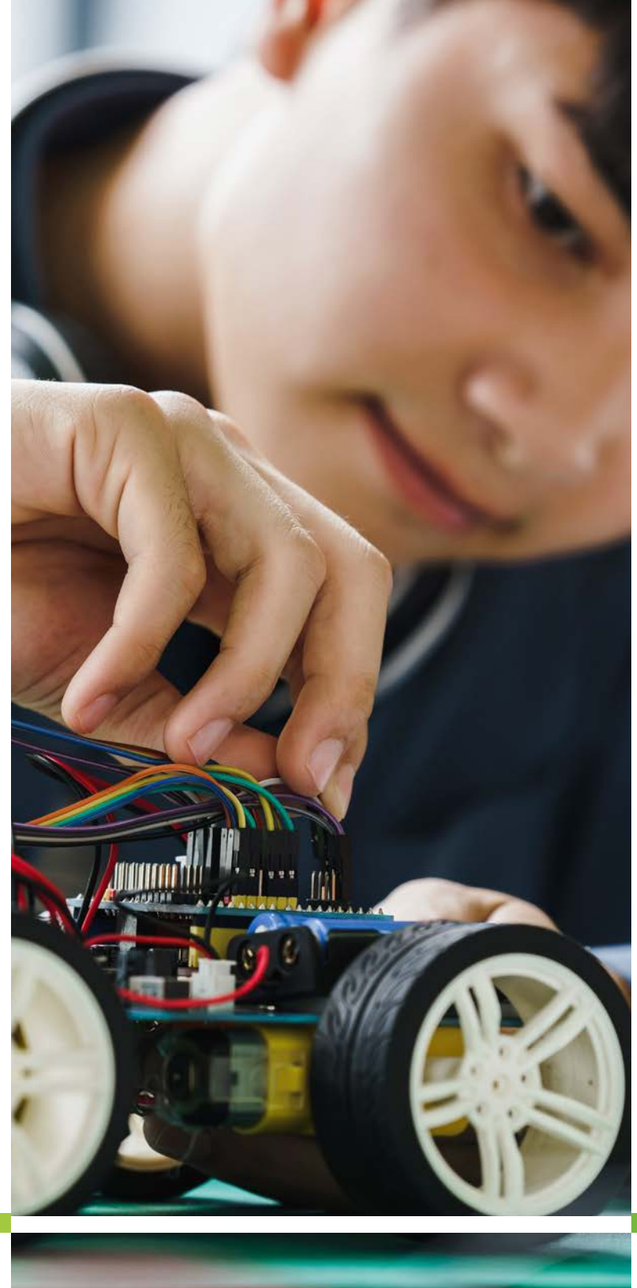
(b) The time the student took to complete the test,

(c) Score improvement from year to year, and

(d) Item response theory-based measure of person-fit.

Those metrics were then compared to state averages and students/testing sessions were flagged as aberrant if they were more than four standard deviations above the state averages. Reports were provided to the state department of education and individual school districts. HumRRO also reviewed the business rules used to calculate key metrics for New Mexico schools and trained state staff to independently compute the English language learner progress metric, ensure clarity of business rules, and facilitate the creation of similar rules for other indicators.

During this period, HumRRO continued to serve as the independent quality assurance provider for analyses of state student assessment results. This work was performed for a wide variety of states, including Indiana, Ohio, Arkansas, Virginia, Tennessee, Illinois, Arizona, and Florida. Alignment studies were also an ongoing focus and researchers carried them out for a variety of subjects and grade levels in Pennsylvania, Delaware, Maine, Mississippi, Alaska, New Jersey, and Colorado.



Finally, in the area of career exploration, HumRRO staff continued to support the Department of Defense Career Exploration Program, through which schools can a administer the Armed Services Vocational Aptitude Battery free of charge to their students. Those students can then use their verbal, math, and science/technical composite scores in conjunction with an interest inventory to explore civilian and military careers. HumRRO staff carried out research studies and provided IT support to maintain and enhance the CEP website. In another example, for a large-scale college entrance testing program, HumRRO researchers embarked on various efforts to support the use of scores for career exploration purposes. Among other things, HumRRO developed algorithms to link student scores to occupations in the Department of Labor's Occupational Information Network (O*NET) and developed a short measure of Holland's RIASEC interest dimensions (Realistic, Investigative, Artistic, Social, Enterprising, Conventional) that can be administered and used as an additional tool in investigating post-high school options.

HumRRO also provided assistance to a private sector client that offers a career guidance system to aid students (beginning as early as middle school) in identifying promising career options. After completing an aptitude battery and career interest inventory, a student's score profile is matched to corresponding profiles of several hundred occupations from O*NET. Best-matching occupations (or occupational categories for middle school students) are reported, along with detailed information about those occupations. An O*NET database refresh incorporated a shift in the occupational taxonomy, which required an update of the career guidance system to the new set of occupations and corresponding codes. HumRRO identified the population of occupations and provided updated occupational data. Researchers also consulted with the client on how such updates could be efficiently incorporated in the future.

CIVILIAN SELECTION, CLASSIFICATION, AND PROMOTION

OVER THESE FIVE YEARS, HumRRO continued working with a number of clients that have been mentioned previously. This included developing new forms of the Electronic Promotion Assessment System (EPAS) for the Bureau of Alcohol, Tobacco, Firearms, and Explosives (AFT). Using processes similar to those described in the previous chapter, researchers developed three new EPAS forms and equating them to the original form. Under subcontract to the Personnel Decisions Research Institute, HumRRO also continued work in support of the Department of Homeland Security's Cybersecurity Talent Management System. During this timeframe, researchers developed technical capability simulations covering three areas: Cybersecurity Risk Management & Compliance, Cybersecurity Program Management, and Cybersecurity Data Science.

The County of Los Angeles requested that the International Association of Chiefs of Police (IACP) team, including HumRRO, conduct a review of the Los Angeles Sherrif's Department human capital procedures (i.e., recruiting, selection, training, and retention). This was motivated in part by the fact that the hiring process in place could take up to a year or more to complete, which was negatively impacting the ability to hire new officers. The IACP team conducted a series of site visits and reviewed the various HR processes in place. Based on these observations, knowledge of other department's practices, and empirical information drawn from the professional literature, researchers developed recommendations to improve the efficiency, precision, and effectiveness of the processes. HumRRO staff conducted dozens of interviews and focus groups with department managers and incumbents and toured a variety of offices, testing sites, and training facilities. Researchers also reviewed organizational documents and conducted a national survey of similarly situated law enforcement departments. After summarizing the results, HumRRO presented the findings and recommendations in nearly a dozen report out sessions with county and department leadership. The County took steps to implement a large portion of the recommendations and was able to improve hiring and retention and streamline the selection process.

On October 1, 2020, the Elevate Blue Program was created under a grant from the U.S. Department of Justice Response Center. The program was led by IACP and eleven partners (e.g., the Fraternal Order of Police, National District Attorneys Association). Elevate Blue was initiated to provide officers, agencies, and stakeholders with innovative training and resources addressing the leading issues in the American criminal justice system. IACP asked HumRRO to help refine six of the critical topic areas that are appropriate for law enforcement training and to identify terminal learning objectives for each. To accomplish this, HumRRO first refined the topic descriptions and identified related tasks, knowledge, and skill areas. Researchers then conducted a survey of law enforcement personnel to prioritize the topics. Focus groups with community organization representatives yielded information on the most relevant issues pertaining to each topic, and topic area workshops resulted in detailed terminal learning objectives and the standards appropriate for assessing performance.

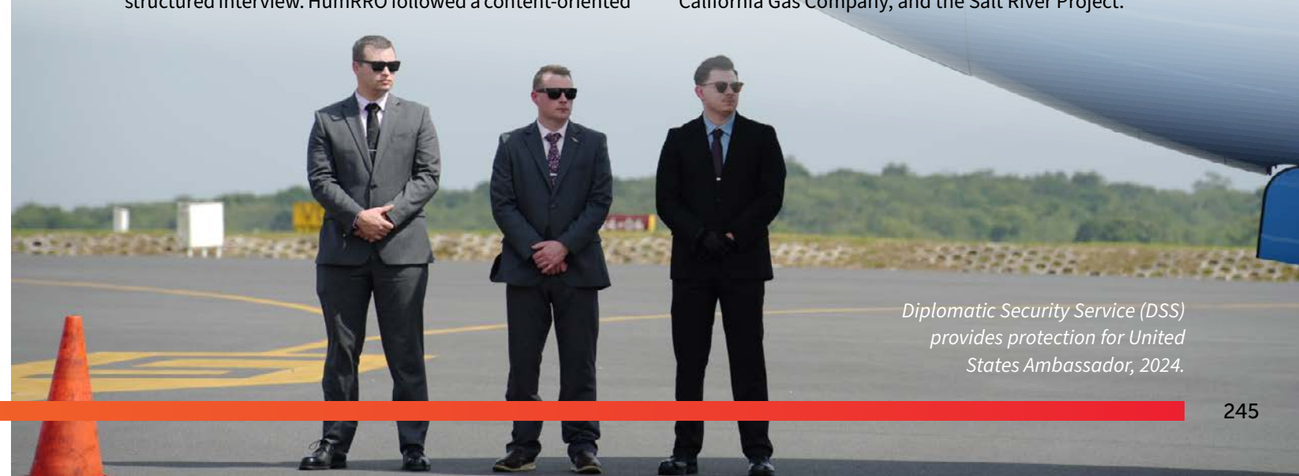
The United States Marshall Service (USMS) serves as the enforcement arm of the federal court system. Among their many duties, the service's Deputy Marshals and Criminal Investigators apprehend federal fugitives, operate the Witness Protection Program, transport federal prisoners, and protect the federal judiciary. Leadership at the USMS play a critical role in accomplishing this mission, and thus it is important that the assessments used to select leaders be high quality and routinely updated to match the content of the job. To address this need, HumRRO updated the job analysis for grades 14 and 15 within the GS-1811 Criminal Investigator job series and developed a Writing Skills Test and a Job Knowledge Test for selecting individuals for these positions.

HumRRO assisted a variety of other law enforcement agencies in developing selection and/or promotion assessments during this period, including the Federal Reserve Board of Governors, the U.S. Customs and Border Protection Agency, the U.S. Drug Enforcement Agency, the Howard County Department of Fire and Rescue, and the City of Suffolk Department of Fire and Rescue.

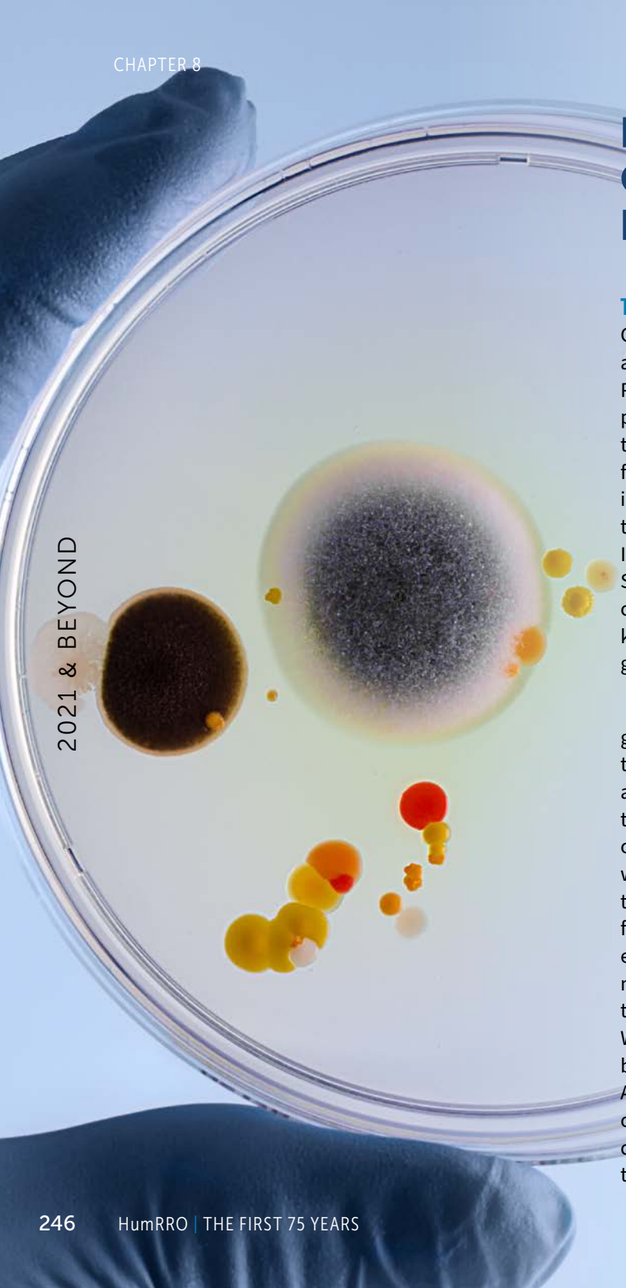
The Presidential Management Fellows (PMF) program was established over 45 years ago and was open to advanced degree holders across all disciplines. The goal of the program was to recruit and develop a cadre of future government leaders from all segments of society. Eligible individuals applied to be selected as finalists, and then had 12 months to secure an appointment as a Fellow, which was a two-year, full-time, paid fellowship at a Federal agency. The Office of Personnel Management (OPM) requested that HumRRO assist them in developing assessments to select Fellows. Researchers first created an assessment plan and a strategy for developing assessment tools. These included a bio-data instrument, a situational judgment test and a structured interview. HumRRO followed a content-oriented strategy to develop the assessments and to demonstrate the linkage between test content and job content. OPM was able to immediately administer the assessments to over 10,000 candidates and selection decisions were being made 14 months after the project began.

Under subcontract to OBAN, HumRRO was asked to develop and validate a Physical Readiness Test (PRT) to select Department of State Special Agents and assess job incumbents. Researchers reviewed existing PRT test materials and previous job analyses, conducted a supplemental job analysis to identify relevant working conditions, analyzed archived PRT scores, and identified required physical abilities. HumRRO then identified physical tests to include in a validation study and developed and pretested criterion measures. PRT and criterion measure data were then collected from job incumbents and training recruits. The resulting data were used to determine the final test battery and passing scores. HumRRO also developed a test manual and test administrator training and summarized all activities in a final report.

HumRRO also worked with a variety of other clients to develop, validate, and/or administer physical employment tests, including the Port Authority of New York/New Jersey, the Chesterfield County Fire and EMS, the Southern California Gas Company, and the Salt River Project.



Diplomatic Security Service (DSS) provides protection for United States Ambassador, 2024.



EMPLOYEE & ORGANIZATIONAL DEVELOPMENT

THE MISSION of the Association for Professionals in Infection Control and Epidemiology (APIC) is to advance the science and practice of infection prevention and control. Infection Preventionists (IPs) include nurses, physicians, public health professionals, epidemiologists, microbiologists, and medical technologists. The COVID-19 pandemic underscored the need for IPs, resulting in rapid growth in higher education programs in the field. APIC noted this trend and developed a plan to support these programs by creating a pathway to IP careers through the IP Academic Pathway (IPAP) initiative. They then worked with SMEs to define an infection prevention and control (IPC) educational framework and created lists of subtopics within each knowledge domain needed for certificate, undergraduate, and graduate programs.

APIC contracted with HumRRO to develop IP curriculum guidelines and a method by which the guidelines can be used to evaluate IP programs. HumRRO created, programmed, and administered two, anonymous, large-scale surveys—one for the academic community and another for the professional IPC community—to validate the initial IPC educational framework which consisted of 27 competencies. Respondents were asked to rate the importance of each, the depth of knowledge expected from recent graduates, the frequency with which IPC staff rely on each knowledge area in the first year of employment, and the number of credit hours that should be expected. Results indicated that all areas were important, with variations across degree levels. Working with APIC, HumRRO revised the final list resulting in 11 behavioral and 10 technical competencies to be included in the APIC Curriculum Framework. The list also contained descriptions of IPC programs at each of the three levels, including expected completion time, credit hours, and intended audience. HumRRO then facilitated meetings between a subcontractor (LEAD) and SMEs to review the learning objectives and sample instructional strategies for IPC programs aligned to the Curriculum Framework using materials provided by universities (e.g., syllabi, course descriptions) to create a first draft of the curriculum standards. HumRRO then organized and formatted the results for presentation to APIC. Finally, HumRRO worked with several universities to develop an academic alignment evaluation process including an optional preliminary meeting with APIC, submitting an application, program review, and debrief. This will assist programs that want to establish IPC degree or certification programs and provide potential students with an understanding of what they should cover.

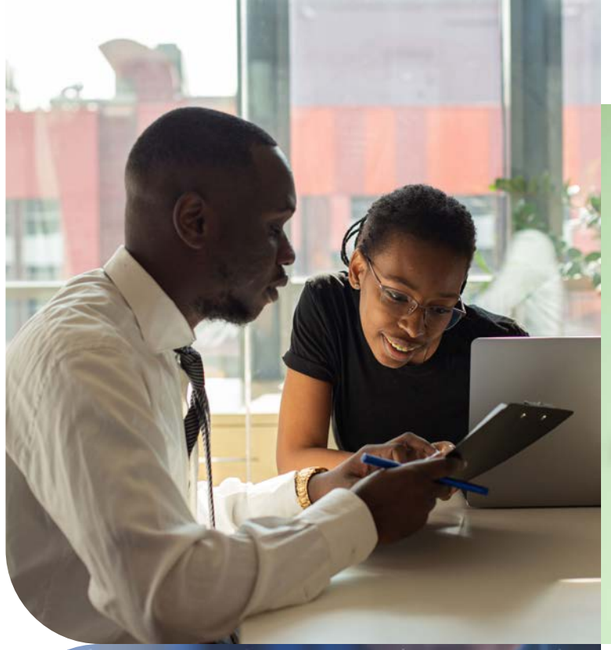
HumRRO's work with the Occupational Information Network (O*NET) continued during this period. Among the activities undertaken was a review O*NET anchor level descriptors, which are concrete, behavioral examples used to define specific rating points (usually 0-7) on a scale for abilities, skills, knowledge, and work activities (e.g., understand signs on a highway). Researchers reviewed each anchor (482 across the four descriptor domains) to identify which should be flagged for replacement due to obsolescence related to terminology or technology, and which should be revised for length or redundancy. A final, formatted list of replacement and revised anchors was compiled and the results summarized in a report to the O*NET center staff. HumRRO also developed and evaluated a new process for identifying related occupations, which took into account what people do, what they know, and what they are called. Finally, HumRRO outlined a process for developing, managing, and administering a tailored email campaign system through which the O*NET center sends information regarding important product developments to individuals who request them.

CERTIFICATION

OVER THESE FIVE YEARS, HumRRO continued to work with many long-standing certification clients, including the Pharmacy Technician Certification Board, the Society for Human Resource Management, and the Association of Social Work Boards. Services provided varied by client, but ranged from item development, test construction, administration, scoring, and conducting periodic job-task analysis and test blueprint updates to reflect changes in conditions and practices.

The International Coaching Federation (ICF) is the world's largest organization of professionally trained coaches. As part of their mission ICF offers credentialing for coach practitioners. HumRRO entered into a master service agreement with ICF to provide support to their credentialing activities. Among other things, HumRRO conducts practice analyses, competency model updates, and critical incident and KSA workshops with SMEs, and uses the results to develop new and updated certification exams for the coaching profession. HumRRO also continues to perform exam maintenance and standard setting activities to support the ICF suite of exams.

CFA Institute is a global, not-for-profit professional organization that provides investment professionals with finance education. In support of their mission, CFA Institute offers the Chartered Financial Analyst (CFA) Program. This is a rigorous standard in the industry, comprising three levels of proficiency (CFA Program Level I, II, and III). The CFA Program Level I exam assesses a range of topics via 180 operationally scored and pretested multiple-choice items. HumRRO worked with CFA Institute to build a suite of programs that allowed for automated test assembly, thereby reducing the level of effort required to develop exams. HumRRO also monitored the results of the program suite's application and made adjustments, as necessary. Finally, researchers led multiple standard setting sessions with SMEs to define the cut score needed to pass specific levels of CFA Institute credential programs.







The National Board for Professional Teaching Standards (NBPTS) requested a feasibility study to assess support for the development of a national competency-based lead teacher certification for early childhood educators. As part of this effort, NBPTS contracted with HumRRO to conduct a job analysis/competency modeling study and develop the competency model to form the basis for the certification exam. After conducting a review of existing documentation, researchers assembled a list of KSAs and tasks for review by SMEs. The data collected were analyzed before a second SME review, which resulted in the proposed content for the competency model.

HumRRO also conducted job analyses for the Board of Psychedelic Medicine and Therapies, and for Registered Diagnostic Cardiac Sonographers.



The School Nutrition Association established the School Nutrition Specialist (SNS) Credentialing Program in 1997 to enhance the professional image of those in the field, elevate professional standards, and enhance individual performance. The SNS Credentialing Exam evaluates candidates' knowledge and skills required to perform specific job activities related to managing or directing school nutrition programs. It is largely geared toward state nutrition specialists and food service supervisors and directors in local school districts. The exam is offered on a rolling basis at national-, regional-, and state-level school nutrition conferences. HumRRO provides exam development and scoring services, as well as producing candidate score reports and summaries of the overall results of each test administration. An annual report provides an overview of each year's activities and the status of the item bank.

The National Veterinary Association (NVA) offers a Hybrid Credential Pathway (HCP) Case Study Summary approach which involves an in-depth analysis of a single case demonstrating participants' knowledge of the content taught in a prescribed set of HCP models. NVA contracted with HumRRO to conduct a validation study to:

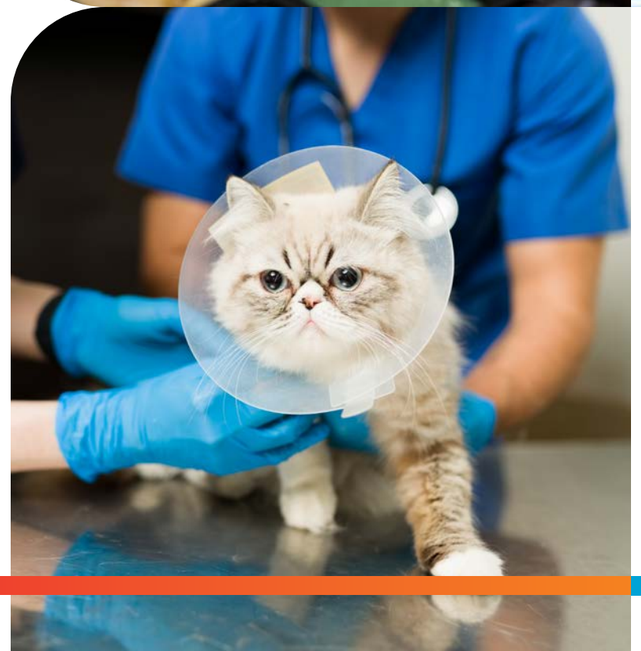
(a) Determine if the Case Summary approach is an appropriate capstone assessment,

(b) Identify areas of gaps and potential improvements in the approach, and

(c) Provide recommendations to align the Case Summary approach with the other professional standards.

HumRRO reviewed a wide variety of relevant documentation and conducted interviews with multiple stakeholders. The final report included recommendations for program improvements and considerations for future actions that could be taken.







The American Physical Therapy Association (APTA) offers the Physical Therapist Clinical Performance Instrument (PT CPI) that can be used to document student performance in an actual clinical experience. It is based on the Clinical Instructor's (CI) direct observation of student performance. The CPI is administered at midterm and at the end of the clinical experience. The Physical Therapist Assistant Clinical Performance Instrument (PTA CPI) is a parallel tool to evaluate PTA student performance in the clinic. After a revision of the CPIs, APTA gathered evidence from users suggesting that they contain some redundancies within instruments and that instructions and some performance criteria lacked clarity, which may have been contributing to inconsistent uses and results. HumRRO conducted interviews and focus groups with CPI stakeholders to develop a clear understanding of the issues surrounding the assessments and provided recommendations for how they could be revised to address the concerns expressed. Researchers then carried out those revisions and provided APTA support in implementing the revised CPIs. Follow-on work included conducting a reliability study based on actual administrations of the CPIs.

Other clients for whom HumRRO conducted credentialing work during this period included the Institute of Internal Auditors, the Casualty Actuarial Society, the American College of Veterinary Radiology, the Society for Human Resource Management, and the National Affordable Housing Management Association.

CHAPTER 8

MILITARY SELECTION, CLASSIFICATION, AND PROMOTION



WORK ON SEVERAL INITIATIVES described in previous chapters continued during this period. The Cyber Test, which is administered variously by the military services to assess the potential of new recruits for computer-related occupations, must routinely be reviewed to ensure that all items reflect the current state of technology. Accordingly, HumRRO staff worked with SMEs to update the test blueprint and develop over 200 new items. Researchers also performed statistical analyses of data collected on items pilot tested under operational conditions to determine which should be added to the item pool and subsequently developed three new item pools. Also mentioned in the previous chapter was an effort sponsored by the Defense Testing and Assessment Center (DTAC) to create an argument-based validity framework for the AFQT as a selection instrument for military personnel. This included a Theory of Action along with interpretive arguments and evidence summaries. During this timeframe, DTAC asked HumRRO to extend this work to address the validity of the ASVAB for personnel classification purposes. Each of the services uses various combinations of subtests to identify occupational specialties suitable for new recruits. HumRRO identified major claims that underlie the use of ASVAB subtest scores for classification and then reviewed the evidence collected to date relevant to those claims. Several issues were noted and recommendations made, including analyzing existing data to strengthen the evidence for existing classification composite scores and reviewing and documenting composite score construction strategies.

Also during this timeframe, HumRRO continued to support the Army Research Institute for the Behavioral and Social Sciences (ARI) in conducting twice yearly cycles of collecting and analyzing criterion-related validity data. This work originally began in 2009 in the TOPS research described in the previous chapter and was centered on validation of the Tailored Adaptive Personality Assessment System (TAPAS). This additional work was broadened to support a variety of research needs, though TAPAS continued to be an important focus. At this point, work was divided between two major contracts—collection and analyses of performance and attitudinal data from enlisted trainees was done through the End-of-Training (EOT) contract. The EOT data were handed off to the Validation of Accession Tools (VAST) contract team, which was responsible for collecting comparable data from soldiers in units, compiling this with data from EOT and multiple administrative sources, and conducting various analyses of interest to the Army. Data included job knowledge tests, self-reported attitudes, separation status, and performance ratings of soldiers. The VAST database has proven to be a key resource for both Army and DoD to empirically examine a variety of important research and policy questions.

As mentioned in the previous chapter, HumRRO convened an expert panel to review the evidence collected to date on the validity of the Tailored Adaptive Personality Assessment System (TAPAS), make recommendations for addressing any gaps that may exist, and suggest future efforts to assess the value of the instrument for military personnel selection and classification. One of those recommendations was that a validity argument, similar to that developed for the ASVAB, be constructed. To accomplish this, HumRRO drafted a theory of action (TOA) and interpretive argument to evaluate TAPAS for selecting enlisted personnel and classifying them into military occupations. The draft validation framework was iteratively reviewed and revised by multiple HumRRO and DTAC staff, as well as military and assessment subject matter experts (SMEs) from each of the services. Once the framework was created, HumRRO staff worked in teams to identify, gather, and organize a library of research and other documentation relevant to the claims and assumptions in the TAPAS interpretive argument. This library was the primary source of evidence summarized in the evidence summaries that comprise the TAPAS validity argument and was an important byproduct of this project. Based on the information collected, HumRRO recommended a program of research efforts to complete the validity arguments for selection and classification uses of the TAPAS, which was documented in a technical report.

Under a contract with ARI, HumRRO also assisted in the collection of data to assess the validity of TAPAS and an interest measure developed by ARI, the Adaptive Vocational Interest Diagnostic (AVID). Researchers worked with SMEs to develop military occupational specialty job knowledge tests that were administered during data collection and constructed two analysis datasets, one for first-term soldiers and another for squad leaders.

Complex reasoning (or non-verbal, non-mathematical reasoning) is the ability to analyze visual information and solve problems using visual reasoning. In recognition of the fact that recruiting and accessing individuals with complex reasoning aptitude is increasingly vital to the U.S. military, HumRRO was asked to develop a test to assess this ability. Researchers started with an existing instrument developed by Sandia National Laboratories which required examinees to solve problems by inferring patterns presented visually in a matrix and then select the response option that best completes the patterns. The patterns presented are defined by rule-based changes in the mix of shapes, their number, their size, their orientation, and other selected features. Researchers evaluated the existing application and made recommendations for its modification for use in the selection of military personnel. They then created a pilot version of the test which was administered to an online sample of individuals comparable to military applicants. Further refinements to the test were made based on the data before it was programmed for administration on the ASVAB test platform and administered to a larger sample of military applicants.



Students in the academic track of the U.S. Army's Future Soldier Preparatory Course work on improving their ASVAB scores, 2023.

The National Defense Authorization Act of 2021 mandated that the Defense Department incorporate a test of computational thinking as defined by six construct domains (e.g., problem decomposition, abstraction, analytical ability), and that the test be available for use by October 1, 2024. DTAC sought HumRRO's help in complying with this requirement. Recognizing that the creation and validation of such a test in the timeframe allowed was highly problematic, HumRRO and DTAC investigated the potential for creating a composite of existing tests that would meet the demand. Researchers gathered empirical and SME-estimated correlations of various existing tests with the constructs of interest. After generating candidate composites, data were collected from a sample of individuals at Military Entrance Processing Stations who were waiting to be shipped to their initial training bases and therefore had existing ASVAB scores. They were administered the Complex Reasoning test described in the previous paragraph and a marker test, the Computational Thinking Assessment for Middle Schoolers (CTA-M). The results suggested that three combinations of existing tests were strong predictors of CTA-M scores. The services were briefed on the findings and the potential for implementing the composites for the purpose of identifying applicants with strong computational thinking abilities.

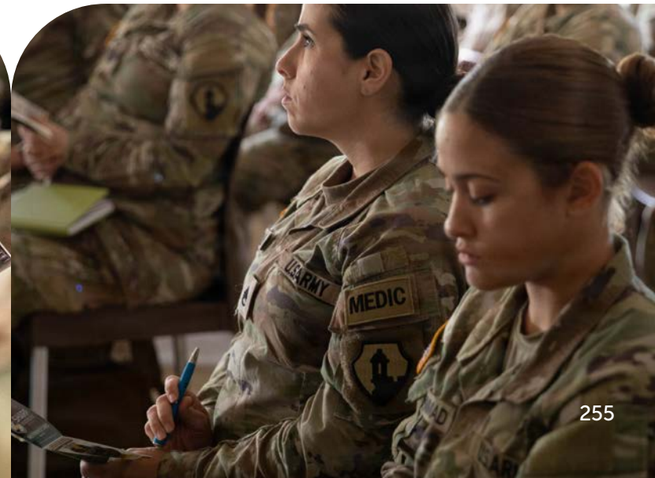
In 2021, at the direction of the President, the Secretary of Defense ordered an Independent Review Commission (IRC) on Sexual Assault in the Military, with the goal being to address sexual assault and harassment in the force. The Commission made recommendations related to accountability, prevention, climate and culture, and victim care and support. One of those recommendations was to implement a pre-accession screen to identify those whose core values are aligned with military service. Prior to the IRC's recommendations, the Military Compatibility Research Group was established to minimize the entry of individuals likely to become security risks, have disciplinary issues, or be disruptive to unit cohesion. During the 2020-2022 timeframe, the Defense Personnel and Security Research Center conducted a literature review to identify conceptual predictors of misconduct, counterproductive work behaviors (CWBs), violence, sexual assault, antisocial behavior, and attrition. They also reviewed current military applicant screening practices as well as those in other federal and civilian law enforcement agencies.

Right: U.S. Army Reserve soldiers participate in SHARP Training, 2026. The SHARP Program is an integrated, proactive effort by the Army to end sexual harassment and sexual assault within its ranks.

In 2022, DTAC sought HumRRO's assistance in designing, evaluating, and developing assessments of military compatibility. Given the work that had already been done investigating the potential for TAPAS to provide important non-cognitive information about potential recruits, it became the focus of initial efforts. By this time, several versions of TAPAS had been developed to assess different characteristics and meet specific service needs. HumRRO was already involved in developing a joint-service TAPAS with a core set of facets assessed and the option for services to add from an optional set. As a first step, HumRRO researchers worked to refine a meta-model they had developed earlier for explaining military training and job performance that tied together cognitive and non-cognitive predictors. HumRRO also designed a longitudinal research plan to evaluate how well individuals who possess traits incompatible with military core values can be identified using TAPAS, other personality assessments, or assessments by licensed clinicians. Researchers used a variety of methods to establish interim joint-service and military compatibility TAPAS composites (e.g., expert judgment, analyses of extant data). After data collection, HumRRO analyzed the results and worked with the services to refine the composites for final implementation.

A related effort focused on military officers, and included establishing a Non-Cognitive Assessment for Military Compatibility Best Practices Forum, including experts in sexual harassment, counterproductive work behaviors, threat assessment, and employee selection. The mission of the Forum was to ensure that DTAC was current on all research, possible methods, and technological advances for assessing compatibility while maintaining best practices in the use of personality and compatibility assessments. HumRRO researchers worked with Forum members and DTAC to investigate the use of TAPAS and other non-cognitive assessments with officers across commissioning sources and designed research to compare the various options. HumRRO conducted a literature review and identified 42 commercially available pre-hire assessments and 144 assessments developed and used in research as potential candidates. Using various exclusion criteria, this list was narrowed down to two commercial and four research-based assessments. SMEs were then asked to provide evaluations of each using a set of factors previously applied to all tests considered for delivery on the ASVAB test platform (e.g., content validity, reliability, incremental validity, testing time).





OTHER MILITARY R&D

IN OTHER WORK FOR DTAC, HumRRO assembled a panel of experts to provide guidance on how to expand the devices on which the ASVAB can be taken (e.g., tablets, phones) as a potential means of broadening the recruiting pool. The panel made recommendations on how such expansion should be carried out, the data that need to be collected to ensure that the device used does not impact scores, and additional research that should be conducted prior to expansion. HumRRO was also involved in researching the impact of allowing applicants to use calculators when taking the ASVAB math tests (i.e., Arithmetic Reasoning and Math Knowledge) would likely have on test scores, as well as ways to mitigate that impact so as to preserve continuity of score meaning, Finally, researchers worked with DTAC to implement a process for developing a shared vision among all stakeholders for the next generation of military selection and classification testing, including exploring new cognitive and non-cognitive tests that may be administered as part of the current test or in conjunction with it.



The content of the ASVAB has remained relatively static over time, which has led some to question whether the battery is testing knowledge that students have the opportunity to learn in school. The Office of Accession Policy within DoD, requested that DTAC and HumRRO conduct research to investigate this question. A multi-pronged approach was taken, including analyzing data from the 2019 High School Transcript Study conducted by the National Center for Education Statistics (NCES). Through this work, transcripts are obtained for a nationally representative sample of high school students who are also asked to complete a survey about their course taking and future plans. HumRRO analyzed the data to determine if there were differences between students who reported having talked to a military recruiter and those who had not in the courses taken in high school. HumRRO also carried out comparisons between ASVAB content and that of other standardized tests (e.g., ACT. NAEP) and instructional content frameworks (e.g., Next Generation Science Standards). Finally, researchers gathered a sample of high school catalogs and asked subject matter experts to make judgments about whether the topics outlined in the ASVAB subtest blueprints were addressed in the courses offered. The overall results suggested that the academic content of the ASVAB (e.g., math, reading comprehension, vocabulary) is widely covered, while the technical test content (e.g., shop information, auto information, electronics information) was not universally available.

Another question that has been raised repeatedly over time is whether the fact that the ASVAB is only offered in English is excluding potentially successful service members who fail to meet enlistment cut-off scores because they are non-native English speakers (NNES). DTAC requested that HumRRO examine this question, and again a multi-pronged approach was taken. Researchers performed an extensive literature review focused on how English Learners (ELs) are assessed in public schools, as well as how universities screen international students to ensure they have sufficient levels of English fluency to be successful. In addition, a review was conducted of past attempts by DoD and the services to recruit non-native English speakers and provide remedial language instruction, as well as remediation efforts for individuals entering service with lower levels of reading comprehension. HumRRO also examined data from NCES on the number of 11th and 12th grade NNES students in conjunction with findings from the Joint Advertising and Market Research propensity study to estimate the potential size of the NNES recruiting pool. Finally, HumRRO analyzed existing ASVAB data to determine the degree to which performance on the ASVAB verbal tests was the primary factor in denying entrance to service. Overall, the findings suggested that the size of the recruiting pool was relatively small as was the number of individuals denied service based on scores on the verbal tests.



Naval Aircrewman participates in language exchange with Japanese students, 2025

HumRRO PRESIDENTS

SUZANNE TSACOUMIS



SUZANNE TSACOUMIS was born in Washington, D.C. and raised in Silver Spring, Maryland. A classically trained clarinetist, she studied for eight years with the principal clarinetist at the Kennedy Center Opera House, though she ultimately chose a different professional path. Even as a child, she was an active volunteer—a characteristic that would define much of her career.

Suzanne earned her Bachelor of Arts in Psychology and Sociology from Bucknell University in 1982, where she received the Susan Hensinger Thomas Prize, awarded to the graduating senior who best promotes goodwill through the application of psychological principles to daily living. She went on to earn a master's in Industrial-Organizational (I-O) Psychology from Fairleigh-Dickinson University in 1984, and her Ph.D. in I-O Psychology from the University of Georgia (UGA) in 1988, where she was recognized with both the Charles L. Darby Award for outstanding graduate teaching and the Outstanding Teaching Assistant Award.

Before completing her doctorate, Suzanne worked as a research consultant at the American Telephone and Telegraph Company (AT&T), where she developed simulations for telemarketing sales selection processes and participated in validation studies. During her doctoral work, she assisted with classification and compensation studies, and police assessment center programs at UGA's Institute of Government.

Suzanne joined HumRRO in December 1987 and built her career conducting, managing, and consulting on projects associated with the research, development, and implementation of personnel assessment and human capital systems, often in litigious environments. Her expertise has centered on job analysis, selection, promotion, leadership assessment, and performance evaluation. She spearheaded innovative work in the development of rich-media simulations for use in both promotion and self-assessment processes, and she provided expert consultation and witness services in numerous high-profile cases for agencies including the Department of Justice, the Federal Bureau of Investigations, the Drug Enforcement Administration, and the Bureau of Alcohol, Tobacco, Firearms, and Explosives.

On July 1, 2018, Suzanne became HumRRO's President and CEO. She immediately faced the task of searching for a new Chief Financial Officer as the incumbent was retiring.

Then came the unprecedented challenge of the COVID-19 pandemic. She navigated the organization through that crisis by constantly modifying policies to reflect the available science, ensuring the safety and health of staff, communicating frequently across the organization, and working diligently to maintain the company culture while minimizing anxiety and burnout during an extraordinarily dynamic situation. During this period, HumRRO adapted to the challenging environment and thrived—growing in revenues and staff size.

Emerging from the pandemic, Suzanne implemented a telework policy that embraced full-time remote and hybrid options. At the same time, she expanded HumRRO's headquarters space in Alexandria, opened larger and improved offices in Monterey and San Diego, and completely renovated and modernized all office spaces. She also purchased a row house in Old Town Alexandria to accommodate staff traveling from other locations to headquarters.

Under her leadership, HumRRO has more than doubled in size, growing from approximately 114 employees to over 250. This growth required creating new positions—including a Division Director with a background in educational measurement, a Chief Technology Officer, a business development manager, a proposal manager, a proposal coordinator, and a pricing specialist—and effectively managing the organizational change that accompanied such expansion. In addition, in July 2019, she led the acquisition of the Pittman McLenagan Group, a boutique consulting firm specializing in developing and implementing selection systems in the public safety arena.

As president, Suzanne maintains a productive relationship with HumRRO's Board of Trustees. She worked with the Chair to update the company's by-laws and Board policies. She also took actions to enhance employee well-being and the collegial work environment, providing healthy snacks, sit-to-stand desks, and ergonomic equipment for all employees. Under her leadership, HumRRO has been recognized as a *Washingtonian* magazine Great Place to Work, *The Washington Post* Top Workplace, and a CareFirst Gold Healthy Business.

Given Suzanne's propensity to volunteer—both professionally and personally—she actively pursues additional mission-oriented initiatives that contribute to the field, society, and the community. For example, she created a second HumRRO Fellowship—one awarded to help fund the dissertation research of a graduate student studying educational measurement and evaluation. She also brought HumRRO into the local Urban Alliance chapter—sponsoring a high school student intern each year—and into George Mason University's Early Identification Program, through which HumRRO hosts an annual event for first-generation high school students.

Throughout her presidency, Suzanne has remained an active contributor to the profession. Her volunteer service with the Society for Industrial and Organizational Psychology (SIOP) has included roles as Conference and Programs Officer on the Executive Board, Member-at-Large on the Executive Committee, and Co-Chair of the Leading Edge Consortium marketing committee, among many others. She also served as President of the Personnel Testing Council of Metropolitan Washington. She is a fellow of both the American Psychological Association and SIOP. In 2026, she received SIOP's Distinguished Professional Practice Contributions Award, a testament to the impact of her career's work.

Suzanne's tenure as president has been marked by resilience, growth, and a commitment to both her people and the science that underpins HumRRO's mission. She led the organization through one of the most challenging periods any leader could face, and she did so while positioning the company for a future defined by expansion, modernization, and continued excellence.



HumRRO: ON THE HORIZON

I want to start by expressing how proud I am of HumRRO's employees—and how grateful I am for their work ethic, dedication, technical expertise, and collaborative spirit. They make a difference through the work they do for our clients, through the way they collaborate with one another, and through the collegial and welcoming environment they build every day. It is because of them that HumRRO is an industry leader. It is because of them that we have the culture we have. And for all of that, I am deeply grateful.

I've been at HumRRO for 38 years. How lucky I've been to have landed here—to have found a place where I could blend my service orientation with my technical training. I've grown up here. I've grown up here with a number of our staff. And what I know, after all this time, is that HumRRO is a great place because of its people. Every one of them. They matter. Their work has impact. And they help us actualize what it means to be a nonprofit, mission-driven organization.

So where are we headed?

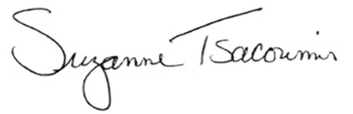
We have changed throughout the years. We've certainly grown. But at our very core, we have stayed true to who we are—an organization that values doing exceptional work, working collaboratively, developing our people, and giving back to science and society. Just good people who are good at what they do. That will not change.

As we look to the future, HumRRO will remain what it has always been: a mission-oriented research and consulting organization with a strong drive to contribute to our clients, to science, and to society. We will continue to focus, first and foremost, on meeting our clients' needs with rigor, creativity, and care. And we will remain the premier research organization in industrial-organizational psychology and educational measurement and evaluation—not by resting on reputation, but by continuing to earn it.

We will also remain an employer of choice. That means continuing to cultivate a collegial and collaborative work environment—one that values and supports professional development, one where employees can perform meaningful work with real impact, and one where people can continue to learn and grow throughout their careers. Our work matters. And the people who do that work deserve a workplace worthy of their talent and commitment.

We will continue to create mission-oriented initiatives that have a real impact on the field and on society. We have always believed that being a nonprofit carries with it an obligation to give back—to advance the science, to develop the next generation of researchers and practitioners, and to contribute to the communities we serve. That commitment will only deepen.

HumRRO's future is bright because its foundation is strong. And that foundation is its people—every one of them. Because of them, HumRRO continues to thrive. And because of them, it will continue to do so for years to come.



Suzanne Tsacoumis, Ph.D.
President & CEO



Celebrating Our

75th Anniversary

CORPORATE HEADQUARTERS

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75th Anniversary

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