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COUNTERATTRITION IN BASIC UNDERWATER DEMOLITION/SEAL PROGRAM: SELECTION AND TRAINING



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**COUNTERATTRITION IN BASIC UNDERWATER
DEMOLITION/SEAL PROGRAM: SELECTION AND TRAINING**

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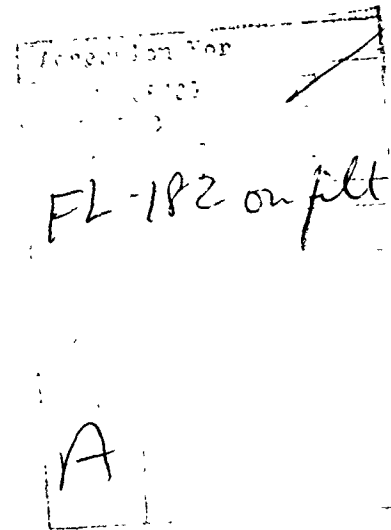
FOREWORD

This project was conducted in response to a request by the Chief of Naval Operations (OP-01). Its purposes were to determine how student selection, student motivation, and organizational policies affect attrition at the Basic Underwater Demolition/SEAL (BUD/S) School, to make recommendations for reducing that attrition, and to evaluate the effect of those recommendations, in terms of attrition and associated costs.

Appreciation is expressed to CDR J. Couture, BUD/S director during the project design and data collection phases; CDR T. S. Nelson, BUD/S director during the recommendations phase; and to the BUD/S staff and students for their assistance and cooperation. FTTCM G. L. Hamm was a particularly valuable source of information. Also, appreciation is expressed to Mr. R. Van Schoik, a BUD/S graduate, who provided many insights during the data collection phase, and Mr. K. Ross, who was responsible for establishing the data base used in this project.

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SUMMARY

Background and Problem

Underwater Demolition Teams (UDT) and Sea/Air/Land (SEAL) Teams are highly trained combat units within the Navy Special Warfare community. These teams are trained at the Basic Underwater Demolition/SEAL (BUD/S) School, Coronado, CA.

Historically, the attrition rate for BUD/S training has averaged 65 percent, most of which is voluntary and occurs early in training. High attrition rates are considered as part of the process of selecting and training the highest quality UDT/SEAL combat swimmers. At the inception of this research project in 1978, however, BUD/S had not produced sufficient graduates to maintain authorized manning levels in fleet Special Warfare units.

Objectives

The primary objectives of this research were to (1) identify factors that relate to BUD/S attrition, (2) develop recommendations that may reduce BUD/S attrition, thereby increasing manning levels in the fleet, and (3) test and evaluate the effect of recommended changes, in terms of attrition and associated costs.

Approach

1. To determine patterns of attrition, attrition data were analyzed for the 850 students in BUD/S classes 94-102.
2. To determine how attrition related to selection variables, attrition, performance, and questionnaire data were analyzed for the 289 students in BUD/S classes 102-105.
3. To determine how attrition related to Hellweek, a particularly stressful period held during the first training phase, data obtained by observing Hellweek activities and conducting interviews with instructors and students were analyzed.
4. To determine how instructor/leader training and selection related to attrition, researchers observed all training evolutions for BUD/S classes 101 and 102, and analyzed interview data obtained during the Hellweek investigation.

Results and Conclusions

Attrition Patterns

1. Attrition data showed that 24 percent of the students in BUD/S classes 94-102 graduated, and 76 percent did not. Voluntary drops accounted for 40 percent of the attrites; and medical drops, for 39 percent. Academic drops accounted for only a small percentage.
2. Thirty-five percent of the attrites dropped during the indoctrination period; 27 percent, during the first 2 weeks of training, 15 percent, during Hellweek; and 23 percent, during the remainder of the training period.
3. Many students admitted to BUD/S have a low probability of successfully completing training. Thus, if the criteria for student selection were changed, it appears that the attrition rate during the early stages of training could be reduced.

Relation Between Attrition and Selection Variables

1. Attrition data showed that 56 percent of the students in BUD/S classes 102-105 graduated, and 44 percent did not. Of the attrites, 41 percent were voluntary drops; and 29 percent, medical drops.
2. Three BUD/S screening test variables--the times required to complete the 300-yard swim and the 1-mile run and the combined score obtained on two ASVAB subtests (Word Knowledge (WK) and Arithmetic Reasoning (AR))--were significantly related to graduation. Also, level of education and prior scuba qualification were positively related to graduation; and amount of commitment to the Navy and marital status, negatively related. The most impressive statistical correlation was that obtained using a composite score computed from scores obtained on four personality/attitude scales.
3. A multiple correlation performed on a selected set of predictor variables showed that the time required to complete the 300-yard swim, prior scuba qualification, and the BUD/S-administered math inventory score account for the maximum amount of explained variance on the pass-fail criterion.
4. BUD/S attrition could be reduced if predictors that were significantly related to training success were included in a selection battery.

Relation Between Attrition and Hellweek

1. BUD/S has many goals for Hellweek, some of which are diverse and inconsistent. It appears that each BUD/S instructor interprets the goals and procedures differently, conducting his training evolutions in accordance with his personal attitudes.
2. Apparently changes are needed in BUD/S instructional procedures to increase student confidence.
3. Some of the voluntary attrition during Hellweek can be traced to the inadequacy of pre-Hellweek briefings. Since students may have inaccurate expectations about Hellweek, preparation may help them develop skills for coping with it.

Relation Between Attrition and Instructor/Leader Selection and Training

Observational data indicated there was considerable variability in the leadership qualities of class leaders. Also, some student leaders indicated that they were not adequately prepared for their responsibilities and needed some additional training.

Recommendations

1. Student screening criteria should be changed by (a) eliminating or strictly limiting ASVAB waivers, (b) employing the BUD/S mathematics inventory as a field screening test, and (c) increasing standards on the physical screening test.
2. A selection monitoring system should be installed at BUD/S. Such a system would include data on numbers of BUD/S applicants, average proportion of BUD/S graduates to attrites at different screening test cut-score intervals, and fleet manning requirements.
3. Special Warfare recruiting/detailing strategies should be evaluated to determine methods of increasing the number of qualified BUD/S applicants.

4. Hellweek goals should be prioritized to eliminate inconsistencies and reduce confusion.

5. Hellweek instructional procedures should be changed by (a) standardizing procedures as much as possible, (b) providing positive reinforcement during Hellweek and rewards after students have completed Hellweek, and (c) encouraging students to remain in training rather than accepting voluntary and often impulsive quits during Hellweek training evolutions.

6. Instructors should better prepare students for Hellweek by (a) explaining feelings that they may experience during this stressful period, (b) emphasizing the need for self-reliance, (c) letting them know that Hellweek training is designed to taper off after the third day, and (d) ensuring that student goals for Hellweek are realistic.

7. Hellweek, which now occurs during the fourth week of training (Phase I), should be delayed as long as possible to increase student commitment to BUD/S. The optimum BUD/S curriculum sequence would be to reverse Phase II (diving) and Phase III (land warfare) and to schedule Hellweek during Phase III.

8. Instructors who are selected for BUD/S should be volunteers for the assignment, be a UDT/SEAL careerist, have a broad operational background, have performed adequately in BUD/S as a student, be an E-5 or higher, and be required to serve at least one more operational tour with UDT/SEAL teams after being a BUD/S instructor.

9. A specialized training program should be developed for training BUD/S instructors. Such training should emphasize the ability to adapt to high physical and mental stress, small group leadership and cohesiveness, and motivation and performance enhancement of BUD/S students.

10. Specialized training should be provided at a common site to all instructors in the UDT/SEAL, explosive ordnance disposal (EOD), and Navy diver (ND) communities.

11. Student leaders (officers and petty officers) should be assigned to BUD/S several weeks before indoctrination training begins.

Hellweek Intervention

A detailed version of the recommendations concerning Hellweek (Nos. 4-7 above) was submitted to BUD/S management in January 1979, and selected aspects of those recommendations were implemented beginning in March 1979. Analysis of attrition and performance data for classes held before and after the intervention showed that attrition decreased substantially and remained relatively low for several classes and that there was no decrease in performance.

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INTRODUCTION

Problem

Underwater Demolition Teams (UDTs) and Sea/Air/Land (SEAL) teams are highly trained combat units within the Navy Special Warfare community. UDTs are trained to perform hydrographic reconnaissance/intelligence operations, to conduct demolition attacks against ships and harbor installations, and to facilitate beach landings by assault craft. SEAL teams are trained to conduct unconventional or paramilitary operations in a wide variety of naval or maritime environments. Historically, both UDTs and SEAL teams have a high reputation for combat and operational effectiveness.

Applicants for UDTs and SEAL teams must be between the ages of 18 and 31 years, possess a combined score of 104 on two Armed Forces Vocational Aptitude Battery (ASVAB) subtests (word knowledge (WK) and arithmetic reasoning (AR)), pass a physical screening test and a medical examination, and submit to an oral interview. In the physical screening test, the applicant must (1) swim 300 yards in less than 7-1/2 minutes, (2) run 1 mile in less than 7-1/2 minutes, and (3) perform a certain number of calisthenics--30 push-ups, 30 squat thrusts, 30 sit-ups, and 6 pull-ups--each within 2 minutes.

Successful applicants are trained at the Basic Underwater Demolition/SEAL (BUD/S) School, Coronado, CA. Training begins with a 2-week indoctrination period, followed by 23 weeks of intensive physical and mental conditioning. This training is divided into three phases:

1. Phase I (6 weeks) consists primarily of progressive physical conditioning (swimming, running, calisthenics, obstacle course running) and physical exertion/endurance testing (e.g., in small boat handling) under arduous conditions. The fourth week of this phase is called "Hellweek," which is designed to test the performance of boat crews under extreme physical and mental stress. During this 5-day period, individual team members are brought close to their physical and emotional "breaking point."

2. Phase II (7 weeks) consists of scuba diving training including both academic (diving physics and medicine) and performance (swimming pool/open water practicums) aspects.

3. Phase III (10 weeks) concentrates on land warfare, including 2-1/2 weeks at San Clemente Island, where exercises covering all aspects of training and simulated combat are conducted.

Historically, the attrition rate for BUD/S training has averaged 65 percent. About 80 percent of the total attrition is voluntary and occurs early in Phase I training, particularly during Hellweek. Since the purpose of BUD/S training is to select and train UDT/SEAL combat swimmers, trainees are purposely subjected to a course that is characterized by demanding physical and mental challenges under adverse, arduous, and stressful operational situations. In fact, high attrition rates are considered to be part of the process of selecting and training the highest quality team members. At the inception of this project in 1978, however, BUD/S had not produced sufficient graduates to maintain authorized manning levels (74% of authorized force) in fleet Special Warfare units.

Background

Research studies that have dealt specifically with BUD/S attrition behavior are described in the following paragraphs.

Physiological Factors

Physical strength and endurance have been shown to be consistently and substantially related to completion of BUD/S training. Hertzka and Anderson (1956), in studying 130 enlisted BUD/S trainees, found that 100-meter breaststroke time, 1-mile run time, number of pull-ups, number of sit-ups, and age produced a multiple correlation of .63 with the pass/fail criterion. Thus, they concluded that, if selection requirements could be set with specific cut-off scores, the BUD/S attrition rate would be decreased substantially. Alf and Gordon (1958) applied Hertzka and Anderson's test battery to 55 UDT officer trainees and concluded that breaststroke time and number of push-ups were valid predictors of training success. Gunderson, Rahe, and Arthur (1972) investigated 293 enlisted trainees in five BUD/S classes and reported that "physical fitness tests specifically, numbers of sit-ups, pull-ups, and squat jumps were the most important predictors of training success" (p. 430). Biersner, Ryman, and Rahe (1975) studied 124 candidates in a 6-week pre-BUD/S training course and found that the means for number of pull-ups and 300-yard swim time were significantly better for those who passed the course than for those who failed. Finally, Robertson (1979), in reporting preliminary results of a validation of an experimental Navy physical strength test battery against BUD/S trainees in four classes, found that measures of dynamic strength (numbers of sit-ups, pull-ups, and push-ups), static strength (pounds of shoulder/arm pull), and weight-to-height ratio were highly predictive of attrition during Phase I of BUD/S training.

Biochemical correlates of physical performance have also been found to be related to BUD/S attrition behavior. Biersner et al. (1975), in summarizing their own and previous findings in this area, noted that "at the start of training, UDT trainees with relatively high serum uric acid levels, high serum cortisol levels, and relatively low serum cholesterol levels had better chances of success" (p. 215).

Psychological Factors

BUD/S attrition behavior has also been studied in relation to personality and attitudinal factors. Hertzka and Anderson (1956) concluded that personality tests were not useful as predictors of attrition, while Alf and Gordon (1958) found significant validity coefficients between BUD/S officer training success and four personality measures: emotional stability, objectivity, friendliness, and masculinity. Gunderson et al. (1972), in studying responses to the Cornell Medical Index and the Health Opinion Survey, which had been administered to 293 BUD/S trainees, reported substantial correlations between positive emotional well being and training success. Biersner et al. (1975) administered several attitude inventories and found that trainees who passed a pre-BUD/S training course had significantly higher scores on a measure of motivation than did those who failed. Using the same sample, Ryman and Biersner (1975) reported positive correlations between training success and measures of training confidence and of leadership.

Trainee Source

Githens, Neumann and Abrahams (1967), in an analysis of 11 BUD/S training classes, reported that enlisted trainees from U.S. shore billets, air billets, or Recruit Training Commands (RTCs) were more likely to graduate than were those from U.S. fleet or overseas shore billets.

Age

Hertzka and Anderson (1956) recommended that UDT candidates under 19 years old should not be accepted, because of their relatively high attrition rate. Similarly, Githens et al. (1967) found that only 27 percent of trainees under 19 years old passed BUD/S,

compared to 37 percent of those 19 and above. Finally, Gunderson et al. (1972) reported a higher failure rate for 17- and 18-year-olds in their sample than for other age groups. All of these studies reported satisfactory attrition rates for the small number of students over the age of 30.

Objectives

The primary objectives of this research are:

1. To identify factors that relate to BUD/S attrition.
2. To develop recommendations that may reduce BUD/S attrition, thereby increasing fleet manning levels.
3. To test and evaluate the effect of recommended changes, in terms of attrition and associated costs.

APPROACH

Different approaches and sets of data were used to accomplish the stated objectives:

1. To determine patterns of attrition, attrition data were analyzed for the students in BUD/S classes 94-102.
2. To determine how attrition related to selection variables, attrition, performance, and questionnaire data were analyzed for the students in BUD/S classes 102-105.
3. To determine how attrition related to Hellweek, data obtained by observing Hellweek activities and conducting interviews with instructors and students were analyzed.
4. To determine how instructor/leader training and selection related to attrition, researchers observed all training evolutions for BUD/S classes 101 and 102 and analyzed interview data obtained during the Hellweek investigation (3 above).

These various approaches are described in the following sections.

ATTRITION PATTERNS

Method

To determine attrition patterns, attrition data were collected for the 850 students in BUD/S classes 94 through 102. This covered the period from May 1977, when members of class 94 began indoctrination training, through May 1979, when members of class 102 graduated. Nongraduates were classified under the following attrition categories:

1. Voluntary drops (VOL)--Students who leave voluntarily.
2. Medical drops/rollbacks (MED)--Students who leave because of medical problems or injuries sustained.

3. Screening test failures (FAIL SCREEN)--Students who fail to pass the physical screening test, which is readministered after students arrive at BUD/S.

4. Academic drops/rollbacks (ACAD)--Students who fail to meet the academic standards required to graduate from BUD/S.

5. Performance drops/rollbacks (PERF)--Students who fail to meet the performance standards required to graduate from BUD/S.

6. Administrative drops/rollbacks (ADMIN)--Students who leave involuntarily because of failure to meet administrative standards.

Attrition data were further analyzed to determine when students in the various attrition categories left BUD/S.

Results

Attrition data showed that 204 (24%) of the students graduated, and 646 (76%) did not. Table 1, which provides the percentages of nongraduates in each attrition category, shows that voluntary drops accounted for the largest percentage, followed by medical drops. Academic drops accounted for only a small percentage.

Table 1
Nongraduates of Classes 94-102
by Attrition Category

| Attrition Category | N | Percent |
|---------------------------------------|-----|---------|
| Voluntary drops (VOL) ^a | 261 | 40.4 |
| Medical drops/rollbacks (MED) | 254 | 39.3 |
| Screening test failures (FAIL SCREEN) | 44 | 6.8 |
| Academic drops/rollbacks (ACAD) | 39 | 6.1 |
| Performance drops/rollbacks (PERF) | 33 | 5.1 |
| Admin. drops/rollbacks (ACAD) | 15 | 2.3 |
| Total | 646 | 100.0 |

^aReasons for voluntary dropouts given during exit interviews included fear, swimming/physical demands, cold environment (primarily water), motivation/attitude, inaccurate expectations about BUD/S, and external/family problems.

Figure 1, which indicates when students in the various attrition categories left BUD/S, shows that 224 (34.7% of total attrites) attrited during the 2-week indoctrination period; 176 (27.2%), during the first 3 weeks of training; 95 (14.7%), during Hellweek; and 151 (17.8%), during the remainder of the training period. (Percentages shown in the figure refer to proportion of students in classes 94-102.)

3. Screening test failures (FAIL SCREEN)--Students who fail to pass the physical screening test, which is readministered after students arrive at BUD/S.

4. Academic drops/rollbacks (ACAD)--Students who fail to meet the academic standards required to graduate from BUD/S.

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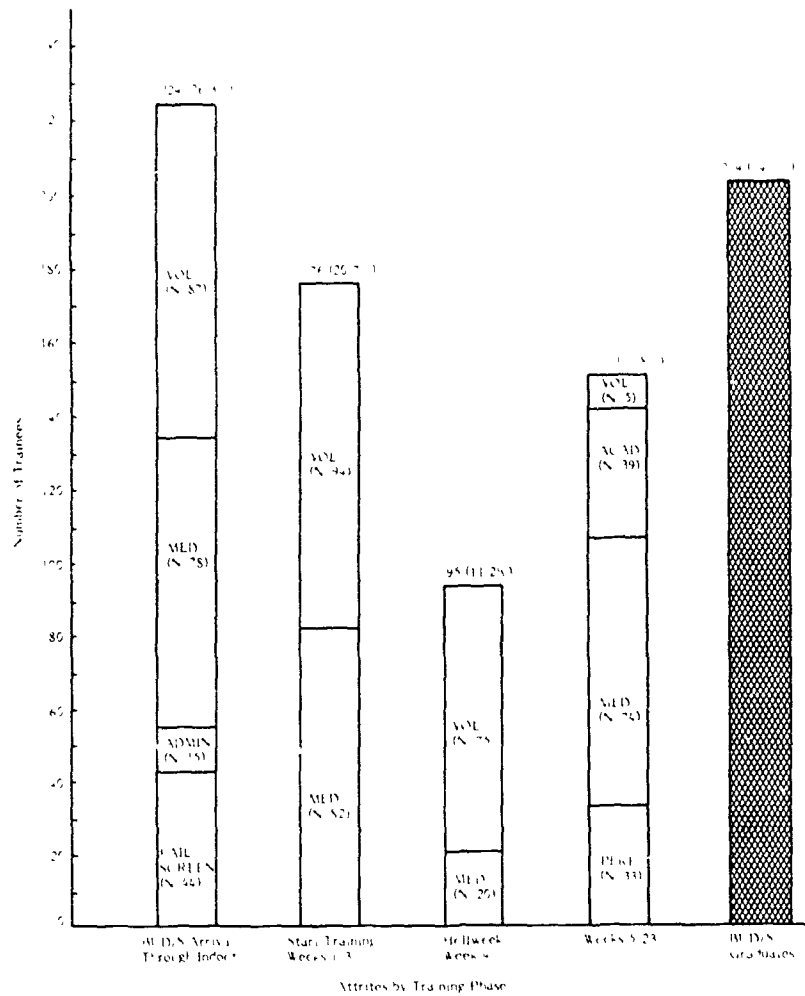


Figure 1. Historical breakdown of BUD/S attrites/graduates by training phase and attrition type: Classes 94-102.

These findings show that many students admitted to BUD/S have a low probability of successfully completing training. Those who dropped voluntarily before Hellweek commenced, who failed the physical screening test before the end of indoctrination training, or who dropped involuntarily for administrative reasons obviously were not prepared for training. If the criteria for student selection were changed, the attrition rate during the early stages of training could be reduced.

RELATION BETWEEN ATTRITION AND SELECTION VARIABLES

Method

To determine how attrition related to selection variables, data were collected for the 289 students in BUD/S classes 102 through 105. This covered the period from November 1978, when class 102 began indoctrination training, through December 1979, when class 105 graduated. The following data were collected from BUD/S personnel folders and instructors' records:

1. Attrition data, including reasons for attrition.

2. Screening-test variables:

- a. Combined score obtained on ASVAB AR and WK subtests.
- b. Time required to complete the 1-mile run test administered after trainees arrive at BUD/S.
- c. Time required to complete the 300-yard swim test administered after trainees arrive at BUD/S.
- d. Score obtained on the mathematics inventory, which is administered shortly after students arrive at BUD/S and which is designed to test basic mathematic skills that are prerequisites for the diving physics curriculum.

Other variables were obtained from a comprehensive questionnaire administered to sample members. This questionnaire included the following:

1. Demographic items (e.g, age, race, educational background, marital status, etc).
2. Navy Orientation Scale--A 15-item scale designed to measure Navy commitment, loyalty, etc.
3. Personality Research Form--A 60-item true/false questionnaire designed to measure attitudes and expectations concerning group cohesion and leader support.
4. Eysenck Personality Inventory--A 24-item yes/no inventory designed to measure emotional/behavioral stability.
5. Group Environment Scale--A 18-item true/false questionnaire designed to measure attitudes and expectations concerning group cohesion and leader support.
6. Work Environment Scale--A 27-item true/false questionnaire designed to measure individual task involvement, peer cohesion, and staff support.

To see how attrition related to these variables, the pass/fail criterion was correlated with (1) the selected screening-test variables, (2) demographic variables, (3) Navy orientation variables, and (4) a composite personality/attitude score computed from scores obtained on the Personality Research Form, Eysenck Personality Inventory, Group Environment Scale, and Work Environment Scale. Also, a multiple correlation analysis was performed on a selected set of predictor variables to determine whether setting cut-off scores on these variables would reduce attrition.

Results

Questionnaire data showed that sample members ranged in age from 17 to 34 years, and included 14 officers and 275 enlisted men (of these, 214 (78%) were in pay grades E-2 or E-3). Ninety-six percent were Caucasian; and 4 percent, members of other ethnic groups. As to origin, 7 percent arrived directly from RTCs; 52 percent, from "A" schools; 9 percent, from fleet/shore commands; 18 percent, from fleet/sea commands; and 14 percent, from other sources (e.g., foreign services).

Data obtained from BUD/S personnel folders and instructors' records showed that 161 (56%) of the sample graduated from BUD/S and 128 (44%) did not. Of the nongraduates, 53 (41%) were voluntary drops; 37 (29%), medical drops; 6 (5%), academic drops; 19 (15%), performance drops; and 13 (10%), administrative drops. For the purpose of analysis, data for administrative and medical drops were excluded (N=50). Thus, the final sample consisted of 239 students--161 graduates and 78 attrites.

Table 2, which provides the correlations between the selection variables and the pass/fail criterion, shows that three BUD/S screening test variables were significantly related to graduation: the times required to complete the 300-yard swim and the 1-mile run, and the combined score obtained on ASVAB subtests WK and AR. The score obtained on the mathematics inventory, which is administered during BUD/S indoctrination, also was highly related to training success.

Table 2
Correlates of BUD/S Graduation

| Variable | Correlation Coefficient (N = 231) |
|--------------------------------|-----------------------------------|
| <u>BUD/S Screening-Test</u> | |
| 300-yard swim | .31* |
| 1-mile run | .28* |
| ASVAB subtest Scores (WK + AR) | .29* |
| Math inventory | .44* |
| <u>Demographic</u> | |
| Education | .25* |
| Pay grade | .16 |
| Marital status | -.17* |
| Age | .00 |
| Height | .04 |
| Weight | .11 |
| Physical sports experience | .13 |
| Prior scuba-qualified | .19* |
| <u>Navy Orientation</u> | |
| Navy career expectation | -.13 |
| Navy commitment | -.18* |
| <u>Personality/Attitude</u> | .52* |

*p < .01.

Among demographic and Navy orientation variables, level of education and prior scuba qualification were significantly correlated with graduation in the positive direction; and marital status and amount of commitment to the Navy, in the negative direction. That is, students who had more education, were scuba-qualified, were unmarried, and were less committed to the Navy (presumably, they were more committed to becoming a combat swimmer) had higher graduation rates than did other students.

The personality/attitude measure demonstrates the most impressive statistical correlation with BUD/S graduation. Specifically, persons who do not avoid stressful situations, are highly motivated to achieve, are not aggressive, have high emotional stability, are highly involved in their work and in group efforts, and are supportive of their superiors have a high likelihood of completing BUD/S.

A number of the relationships between selection variables and training success are presented in Figures 2 through 8. Figure 2 shows that only 41 percent of those who scored in the lowest performance quartile for the combined run-swim graduated, compared to 76 and 79 percent of those who scored in the two highest performance quartiles.

Figure 3, which compares graduation rates for the ASVAB quartiles, shows that trainees in the lowest quartile scored below the currently employed ASVAB (WK + AR) selection criterion cut-score of 104 (these trainees were admitted as waivers), and that only 51 percent of this group graduated from BUD/S. The three higher scoring quartile groups demonstrated progressively higher graduation rates. Similar results are evident for math inventory scores in Figure 4. Only 40 percent of the low quartile group graduated from BUD/S.

Figure 5 shows that only 50 percent of non-high school graduate succeeded in BUD/S. As a result of the small group size, however, this finding may be due to chance. Figure 6, with similar statistical limitations, shows that only 58 percent of married trainees graduated from BUD/S.

Figure 7 shows that the relationship between age and graduation is clearly curvilinear, with students under 19 years of age and over 29 years experiencing relatively lower graduation rates. Finally, Figure 8 indicates that students who are scuba-qualified graduate at a considerably higher rate than those who are not.

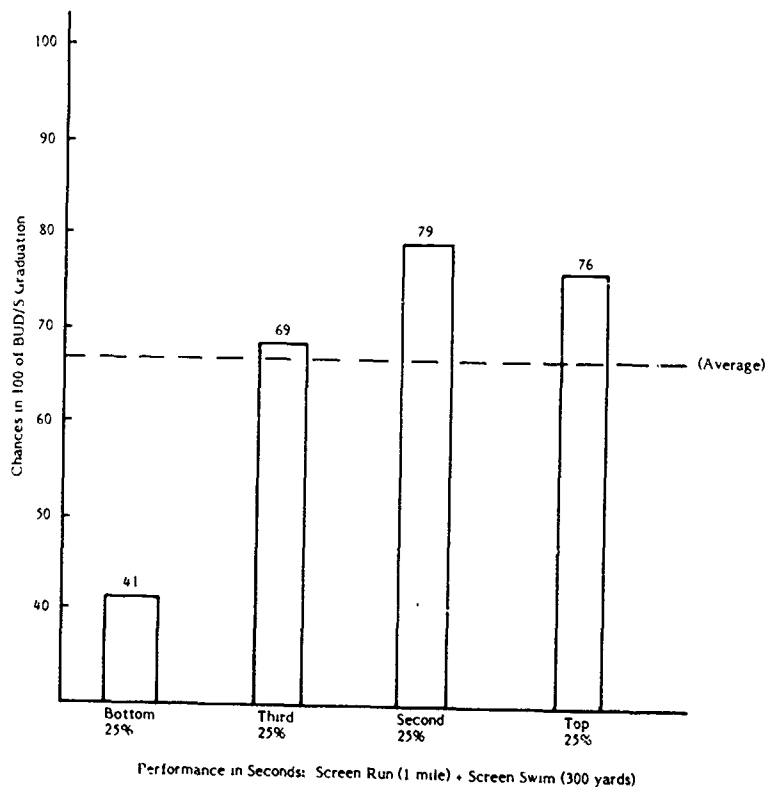


Figure 2. Probability of BUD/S graduation, based on actual attrition rates, of low to high quartile performers: screen run plus screen swim.

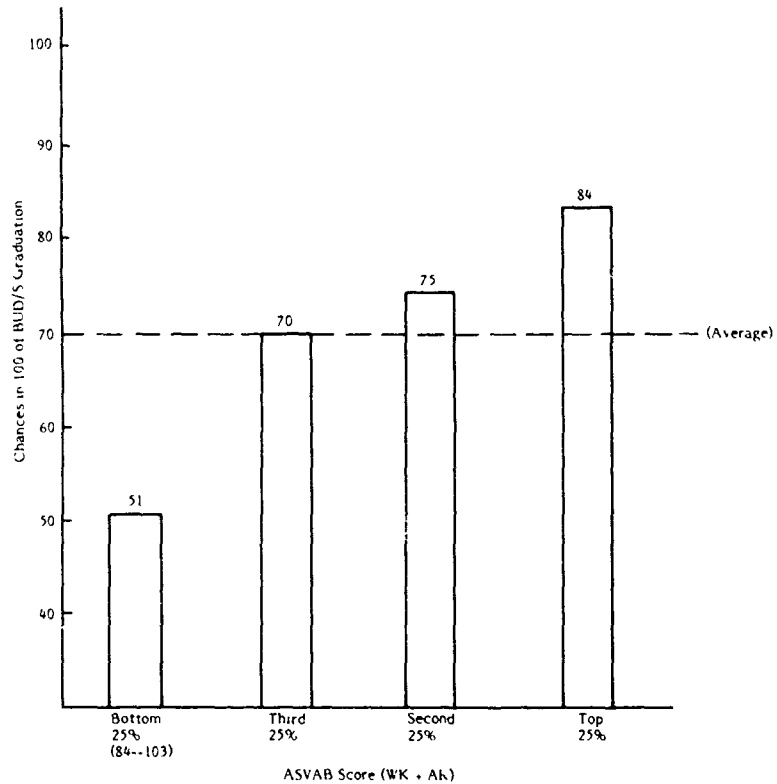


Figure 3. Probability of BUD/S graduation, based on actual attrition rates, of low to high quartile performers: ASVAB (WK + AR).

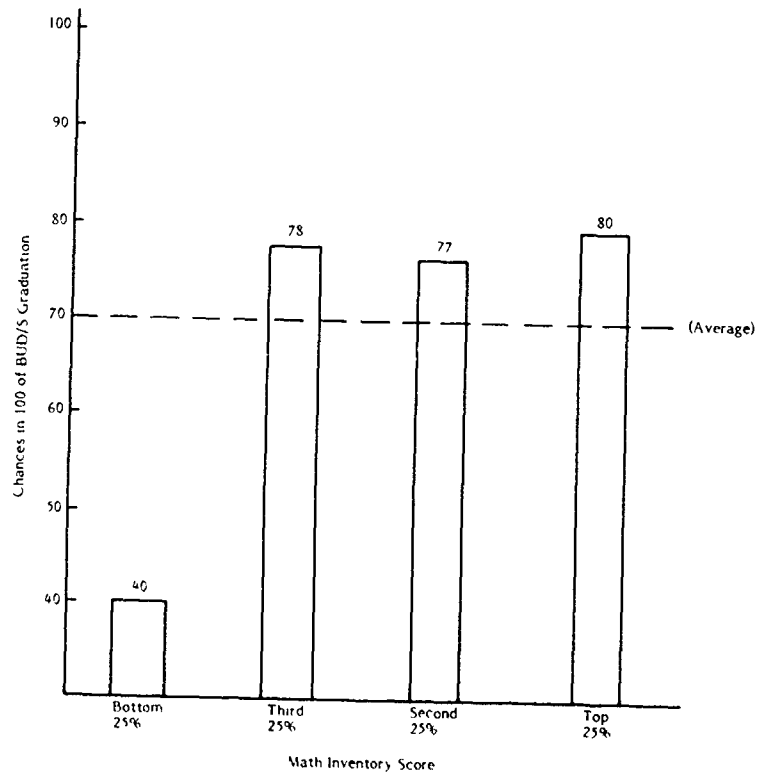


Figure 4. Probability of BUD/S graduation, based on actual attrition rates, of low to high quartile performers: math inventory.

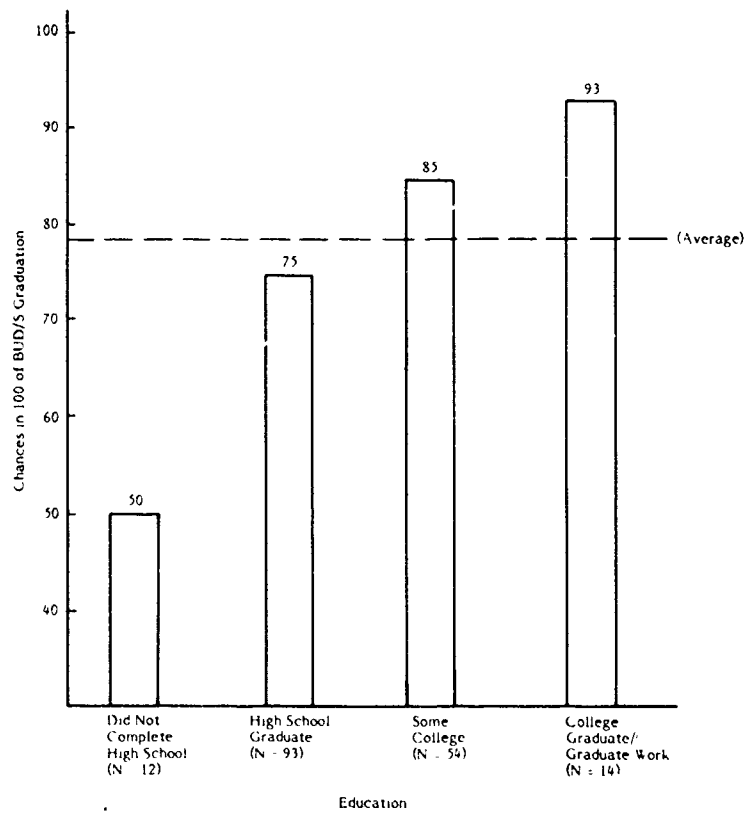


Figure 5. Probability of BUD/S graduation, based on actual attrition rates, of trainees in four education level categories.

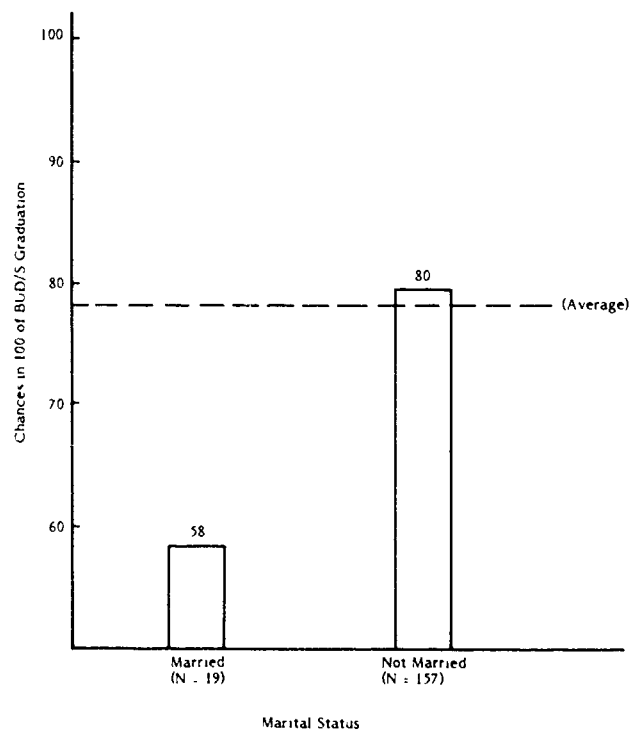


Figure 6. Probability of BUD/S graduation, based on actual attrition rates of married and unmarried trainees.

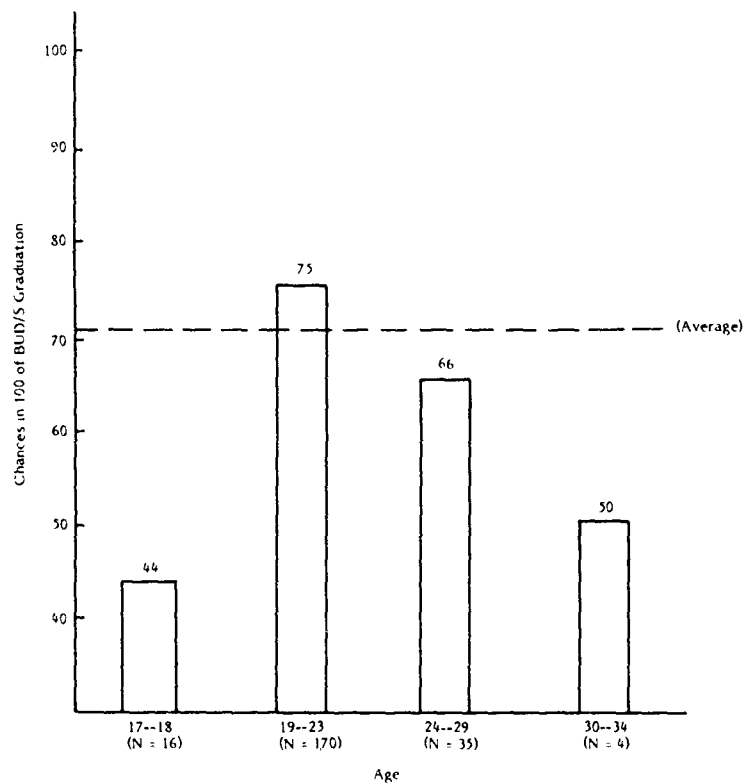


Figure 7. Probability of BUD/S graduation, based on actual attrition rates, in four age categories.

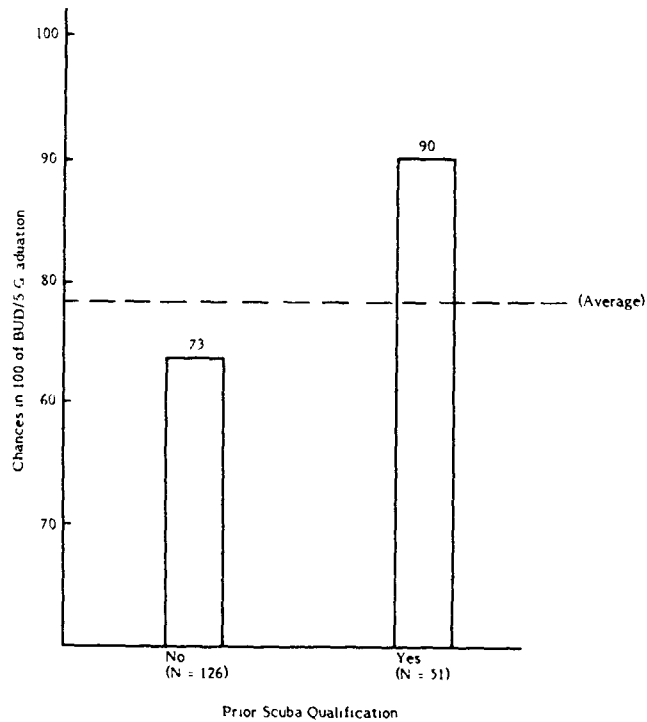


Figure 8. Probability of BUD/S graduation, based on actual attrition rates of trainees who were and were not qualified prior to BUD/S training.

Table 3, which presents the results of the multiple correlation performed on a selected set of predictor variables, shows that the time required to complete the 300-yard swim, prior scuba qualification, and the math inventory score account for the maximum amount of explained variance on the criterion. Although the 1-mile run time and the ASVAB score do not increase the prediction or graduation rate, they were retained in the predictor group and cross-validated. Based on these results, it can be estimated that the BUD/S graduation rate would increase from the current rate of 70 percent to a predicted rate of 76 percent if all five of these predictors were included in a selection test battery. This estimation assumes that selection cut-scores would be set on the five screen-test items so that 26 percent of available applicants would be excluded. This represents the ratio of selected applicants to total applicants at BUD/S during the previous 2 years (a selection ratio of .74). If recruitment efforts resulted in increased numbers of applicants and the selection ratio were improved to .50, however, the predicted graduation rate would increase to 80 percent. This assumes that cut-scores would be set at levels that would disqualify 50 percent of all applicants.

Table 3
 Predicted Improvement in Probability of BUD/S Graduation
 from Application of Field Screen Test Battery

| Screen Test Item | Multiple Correlation | Cross-Validation Coefficient | Probability of Graduation | |
|-----------------------|----------------------|------------------------------|---------------------------|------------------------------------|
| | | | Current (%) | Predicted (%) |
| 300-yard swim time | .40 | | | |
| Prior scuba-qualified | .46 | | | |
| Math inventory score | .48 | | | |
| 1-mile run time | .48 | | | |
| ASVAB (WK + AR) score | .48 | .35 | 70 ^a | 76 ^b 80 ^c |

^aActual graduation percentage of trainees who began Phase I training, classes 102-105.

^bPredicted graduation percentage after application of screen test items with a cross-validity coefficient of .35 and a selection ratio of .74 (Source: Taylor-Russell tables).

^cPredicted graduation percentage with a selection ratio of .50.

Conclusions

1. Despite modifications to the BUD/S training program since its inception, these research findings are generally consistent with results of previous studies that indicate the utility of physical performance tests in predicting BUD/S training success. Notably absent in the research variables that were included in this effort are "calisthentic" types of physical fitness tests (especially sit-ups and push-ups), which have been found to be strongly related to attrition/graduation behavior. The validity of these measures for classes 101-104 and 107-108 will be addressed in a NAVPERSRANDCEN technical report currently being prepared.

2. Table 2 showed that performance in 300-yard swim, 1-mile run, and the ASVAB were valid predictors of training success. The fact that BUD/S trainees who scored relatively low on the 300-yard swim and the 1-mile run experienced significantly lower graduation rates indicates the potential benefits of establishing more rigorous selection criteria cut-scores. This conclusion is supported by the finding that BUD/S students who scored below the established ASVAB (WK + AR) cut-score of 104 were much less likely to graduate than were those scoring above the standard (see Figure 3). As indicated previously, these low ASVAB performers (25% of classes 102-105) were admitted to BUD/S as waivers.

3. The fact that 90 percent of all students who were prior-scuba qualified graduated from BUD/S attests to the importance of diving, diving equipment, and cold water experience. Similarly, the fact that students who scored low on the mathematics inventory had lower graduation rates than those who scored high attests to the intellectual demands of the diving physics curriculum. Several other research variables are of interest in terms of understanding attrition behavior but are not necessarily applicable or appropriate to BUD/S screening: education level, pay grade, Navy orientation, and marital status.

Although the personality/attitude variable was highly related to the pass/fail criterion, it was not included in the final predictor group for several reasons. First, this measure is a composite of a number of components of four comprehensive personality inventories and is intended only as a preliminary analytical tool. Second, these personality inventories were administered to students who had already been admitted to BUD/S. Among BUD/S applicants, the validity of personality factors may be confounded by artificially positive responses to transparent questions. Third, the additional increase in graduation rates by using these questionnaires may be too small to outweigh the costs and logistical considerations of administering them as part of the field screening process.

4. The practical relationship between the validity of a screening test battery and the graduation rates of selected applicants is dependent upon the size of the available applicant pool. Given the predictive validity of the selection items in Table 3, a sufficiently large number of applicants is necessary to afford setting selection criteria cut-scores at levels that will increase the probability of graduation among selected trainees. The greater the decrease in attrition rates resulting from empirically validated cut-scores on a variety of selection tests, the greater the increase in the number of rejected applicants who would have satisfied training performance standards and graduated from BUD/S. From a management standpoint, this increase is inconsequential only if the numbers of graduates are sufficient to meet fleet manning requirements.

Recommendations

1. The policy of granting ASVAB waivers should be eliminated or applied only to applicants who demonstrate superior performance on other screening criteria.

2. The mathematics inventory should be used as a field screening device. Mathematics deficiencies should be corrected before students enter BUD/S.

3. Performance standards on the physical screen test should be increased to reflect, more realistically, the physical demands of BUD/S training.

4. A selection monitoring system should be installed at BUD/S. Such a system would include data on numbers of BUD/S applicants, (b) average proportion of BUD/S

graduates to attrites at different screening test cut-score intervals, and (c) fleet manning requirements.

5. Special Warfare recruiting/detailing strategies should be evaluated to determine methods of increasing the number of qualified BUD/S applicants.

RELATION BETWEEN ATTRITION AND HELLWEEK

Method

To determine why so much attrition (mostly voluntary) occurs during Hellweek, researchers observed members of class 101 going through Hellweek in October 1978. Also, interviews were conducted with (1) instructors who either taught Phase I materials or were in key positions during Phases II and III (N = 20), (2) members of class 101 before and after they participated in Hellweek (N = 9), (3) recent graduates (class 99) (N = 6), and (4) attrites from classes 101 and 102 (N = 11). The interviews were open-ended and confidential, with staff and students openly expressing their views as to the purposes of Hellweek and the causes of attrition. Data obtained were checked for consistency with other sources before they were considered as the basis for recommended changes.

Results

Data obtained concerned four basic areas: (1) priority of Hellweek goals, (2) instructional procedures, (3) student preparation, and (4) position of Hellweek in the curriculum. These areas are discussed below, along with recommended changes.

Priority of Hellweek Goals

Discussion. Results of student and staff interviews showed that BUD/S has many goals for Hellweek, some of which are diverse and inconsistent. Some of the goals frequently cited included (1) simulating combat, (2) eliminating those not expected to graduate, (3) increasing student confidence in their being able to perform at higher levels than they previously thought were possible, (4) demonstrating high commitment to BUD/S by a willingness to "pay the price of entry," (5) demonstrating emotional stability under high stress, and (6) demonstrating "never-quit" behavior regardless of difficulty of task.

The interviews indicated that each instructor interpreted the goals and procedures differently, conducting his evolutions in accordance with his personal attitudes. The students perceived these inconsistencies and began to question their commitment to BUD/S. This uncertainty often led to voluntary disenrollment, especially during a stressful evolution.

Recommendation. Hellweek goals should be prioritized to eliminate inconsistencies and reduce confusion. Before this recommendation can be implemented, BUD/S management must decide on the priority of Hellweek goals, Hellweek evolutions must be modified to reflect the spirit of these goals, a quality control system must be set up to monitor the way training is being conducted, and students entering Hellweek must be prepared in order to minimize differences between their expectancies of and experiences in Hellweek.

Instructional Procedures

Discussion. Changes are needed in instructional procedures to increase student confidence so they can perform at limits that they previously thought were impossible. However, if BUD/S determines that imposing maximum sustained stress to test emotional stability is a high priority goal, recommendations for modifying procedures will probably not be appropriate.

Recommendations.

1. Standardize Hellweek procedures. Some Hellweeks are more challenging than others, probably because of the climatic conditions, the spirit and performance of the class, the instructors who are responsible for the evolutions, etc. While Hellweek procedures cannot be completely standardized, the basic ones can be specified, particularly those concerning handling of problems and deciding whether or not to continue in the event of inclement weather, difficult surf conditions, low student morale, etc.

2. Provide some positive reinforcement during Hellweek. The extensive negative feedback provided during training is not motivational to students under high stress. Since the phrase "it pays to be a winner" is used during training, it follows that some payoff (e. g., extra time for lunch or sleep) should be provided for an extraordinary effort or performance.

3. Provide rewards after Hellweek. Many students asserted that the only rewards after Hellweek were "5 months more of very difficult training." BUD/S should devise some feasible rewards that can be presented to students shortly after Hellweek (e.g., special liberty, distributing BUD/S incentive pay immediately following Hellweek, etc.). Completion of Hellweek should be seen as a major milestone toward graduation.

4. Staff handling of impulsive quits. Frequently the decision to quit during Hellweek is based on temporary but extreme frustration, anger, or discomfort. Students who quit under these conditions are quite different from those who have made well-thought out decisions regarding a career change. The latter drops usually pose no problem for BUD/S or for the Naval Amphibious Base, Coronado, which is responsible for them until they receive new orders. The impulsive quitters, on the other hand, usually regret their decision within minutes of having made it and become distraught when they are not reinstated. Often, they lose self-esteem because they feel that they could not withstand the Hellweek pressures and that their instructors see them as losers. As a result, many of them do pose disciplinary problems for NAVPHIBASE Coronado.

Many graduates indicated that the only difference between them and students who quit was that some critical time or event occurred that prevented them from quitting (e.g., the evolution changed, the instructor didn't have time at that moment to talk to the student, or another student who was physically hurting needed support from the would-be quitter). Therefore, rather than making it easy for students to quit, instructors should give them few opportunities to do so (e.g., only at specified times, only through the chain of command, etc.). Also, if a student, after reconsidering his decision, decides to quit, he should not be subject to discipline or verbal abuse from the instructors. Since this is a critical time for the student, particularly in how he relates his BUD/S experience to feelings about himself and his future in the Navy, BUD/S staff members should provide him with special debriefing sessions to improve his self-esteem. For example, they might remind him that he had to be an outstanding performer to be admitted to BUD/S in the first place, cite examples of successful people in other Navy careers after having dropped BUD/S, and discuss the positive and negative aspects of BUD/S training. If possible,

students who appear to be suffering from loss of self-esteem, depression, disorganized thought processes, etc. should be referred to professional counselors who are intimately familiar with BUD/S, or who were former students themselves. The debriefing and counseling sessions should also be used for performance and academic drops, particularly in view of the disciplinary problems caused by former BUD/S students.

5. Recomposition of the boat crews. Because of the substantial attrition during Hellweek, students must be redistributed to fill vacancies in boat crews. However, the stress that students feel when low performers are added to their crews might be minimized by (1) not distributing personnel solely on the basis of height, which often results in a mismatch of the effectiveness of the boat crews, (2) not requiring that newly constituted boat crews immediately undertake hazardous evolutions, such as night rock portage, and (3) not adding a student who is being disciplined to an existing boat crew.

Student Preparation for Hellweek

Description. Some of the voluntary attrition during Hellweek can be traced to the inadequacy of the pre-Hellweek briefings. Students reported that the briefing was (1) not given adequate emphasis, (2) not comprehensive enough, (3) too abstract and not meaningful enough, and (4) often inconsistent with training. An example of this inconsistency was the emphasis on "team spirit" when boat crews are frequently required to compete directly against each other. Students felt it would be better to have the competition objectively measured (e.g., time or distance). Since students may have a set of inaccurate expectations about Hellweek and training, preparation can help students develop skills for coping with Hellweek.

Recommendations.

1. Increase student awareness of "altered" mental states. Several students became alarmed when they experienced memory lapses and general mental confusion during the second or third day of Hellweek. Some voluntarily quit because they were afraid they were too unstable to continue training. If the instructors tell the students about the feelings they may experience and explain that such feelings are normal reactions to stress and extreme fatigue, the students may be able to cope better.

2. Emphasize self-reliance. Students should be told they are responsible for their own motivation. While students do help each other cope, each student must learn to depend on himself and not expect outside help.

3. Explain the relationship between stress and time. Sometimes students will quit because they project the amount of stress or pain they are feeling early in Hellweek to the end of Hellweek and decide they will not be able to tolerate it. In fact, training is designed to culminate on the third day and taper off during the remainder of the week. If this is explained, apprehensions should be dispelled.

4. Set expectations for performance standards. Some high performing students became drops because they did not attain the performance goals they had set for themselves (e.g., being on the winning boat crew, receiving a meritorious performance commendation, etc.). Just because a student is strong physically does not mean that he is superior emotionally or can tolerate stress. Therefore, the important student performance goals should be to (1) give full effort to every evolution, (2) obey all instructions, especially ones relating to safety, and (3) most important, complete the training. Meeting these requirements should be interpreted as a major achievement.

5. Emphasize methods to avoid quitting. Instructors should discuss the feeling of wanting to quit and give examples of how to counteract those feelings.

Position of Hellweek in BUD/S curriculum.

Discussion. Presently Hellweek occurs during the fourth week of training. Some staff members indicated it served as a screening device in dropping those students who did not have the motivation and commitment to complete BUD/S training. However, since students are screened before training, during indoctrination, and during the first 2 weeks of training, an additional screening device may not be cost effective or appropriate.

Recommendation. Hellweek should be delayed as long as possible to increase student commitment to BUD/S. The optimal curriculum sequence would be to reverse Phase II (diving) and Phase III (land warfare) and to schedule Hellweek during Phase III (approximately week 14). This would not only increase student commitment, but would also enable students to "simulate combat" realistically by using some newly acquired combat skills. If, due to logistical and manpower problems, Hellweek cannot be resequenced in the curriculum, consideration should be given to delaying it until the end of Phase I. Some of the benefits to be accrued from rescheduling Hellweek are listed below:

1. Increased student commitment to BUD/S. Graduates indicated that commitment to BUD/S and the UDT/SEAL community developed after they finished training in demolition and diving.

2. Increased time investment in BUD/S before Hellweek. Several drops felt they hadn't "lost much" when they quit in the early stages of BUD/S.

3. Decreased time between Hellweek and graduation. Graduates indicated they had considered quitting during demanding Hellweek evolutions because completing Hellweek would only result in "5 more months of tough training."

4. Hellweek evolutions would better simulate combat. Since one goal of Hellweek is to simulate combat, the training evolutions could be modified to realistically simulate the mental and physical rigors of combat. As a result, students would understand the benefits of such arduous training.

5. Hellweek would enhance the "positive transfer" of learning across the land warfare skills taught in Phase III. Some of the training requirements in Phases I and III are similar. Overall learning could be enhanced by including some of the training material from Phase III (land warfare) into the Hellweek evolution.

Hellweek Intervention

Description

A detailed version of the recommendations concerning Hellweek was submitted to BUD/S management for review and potential incorporation into BUD/S policies and practices in January 1979. Beginning with class 103 (March 1979), BUD/S implemented selected aspects of these recommendations.

Before the recommendations were submitted, the NAVPERSRANDCEN researchers had served as consultants. The next projected research phase was to install an experimental test and evaluation of specific Hellweek recommendations, including a collaborative and negotiated intervention program that would be sufficiently delineated

and standardized to permit statistical evaluation of the strength of the intervention. Given the severity of the attrition problem, however, BUD/S personnel declined a formal experimental test in favor of an immediate management intervention in Hellweek procedures. As a result of this decision, the research team's task became one of monitoring performance/attrition data and reporting results.

Decisions concerning Hellweek intervention were made entirely by BUD/S personnel, with little direct input from NAVPERSRANDCEN researchers. First of all, it was decided that changing the sequence of Hellweek would cause too major an upheaval to be done at this time. Consequently, greater emphasis was placed on preparing students to cope with the stressful training evolutions encountered during Hellweek. Another major change involved the handling of voluntary drops. Rather than accepting voluntary and often impulsive quits during a training evolution, instructors encouraged students to remain in that evolution. In addition, they required voluntary quits to go through the chain of command to ensure that sufficient reason prompted their withdrawal. Overall, Hellweek changes were directed towards establishing more professional management, with the instructor in charge being directly responsible for the actions of his staff and the smooth operation of all evolutions. In particular, instructors became more aware of the effects of their student-directed behavior on the professional goals of Hellweek.

Results

Attrition and performance data were recorded for BUD/S classes before and after the implementation of Hellweek changes. Figure 9, which presents Hellweek voluntary attrition rates for six classes held before the intervention and six classes held afterwards, shows that attrition decreased substantially from pre- to postintervention and remained relatively low for several classes. For classes 101 and 102 combined, 25 out of 70 students (36%) voluntarily quit during Hellweek, compared to 5 out of 148 (3%) for combined classes 103 and 104. Overall, the reduction in attrition from pre- to post-intervention classes was 65 percent, which is statistically significant. While these results are impressive, it must be noted that the attrition decreases cannot be attributed to the effects of management-induced changes in Hellweek alone. Beginning with class 103, student characteristics and/or the relatively warm water season may have contributed to the attrition declines. Because of these factors and the fact that changes in Hellweek procedures were not specifically documented, it is important that BUD/S continue to monitor Hellweek attrition to determine the long-term intervention effects. Further, the rise in attrition in class 108 (the final class monitored by the researchers) may indicate the need for BUD/S to document and institutionalize Hellweek changes in order to standardize policies and instructor practices.

A primary consideration expressed by BUD/S management was that Hellweek attrition should not be reduced at the expense of student performance. Thus, average performance measures of students in the classes held immediately before and after the intervention (102 and 103) were compared. As shown in Table 4, there was no decrement in average performance. These results support the conclusion that Hellweek changes, as opposed to student performance or demographic characteristics, were responsible for attrition reductions. Performance measures, in addition to Hellweek attrition data, should continue to be monitored to ensure the stability of student performance standards.

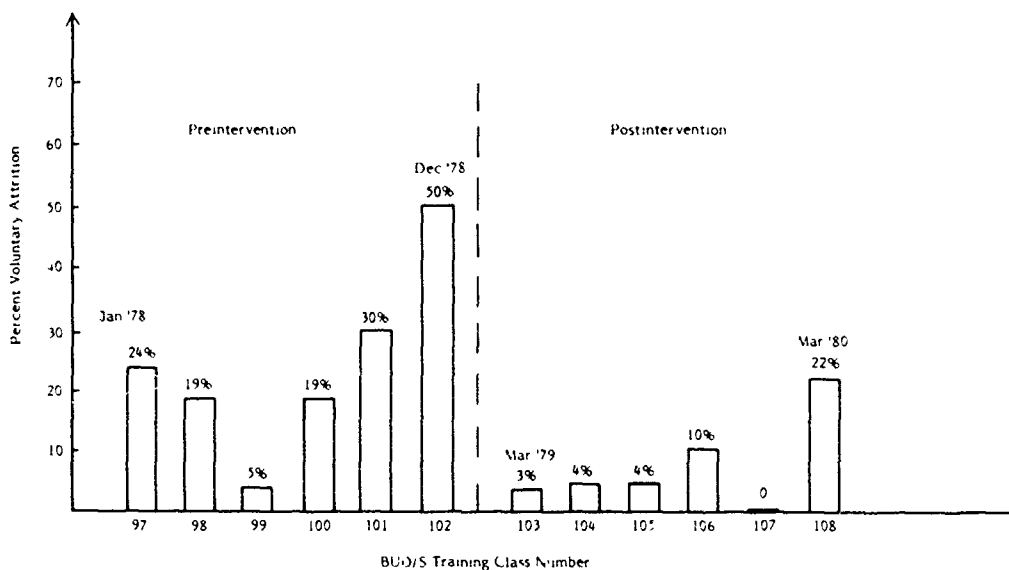


Figure 9. Hellweek voluntary percent attrition for BUD/S classes held before and after the intervention.

Table 4

Comparison of Two Pre/Post Intervention Classes on BUD/S Performance Measures

| Performance Measures | Average Score | |
|-------------------------------------|------------------|------------------|
| | Class 102 (N=38) | Class 103 (N=62) |
| Obstacle course (secs.) | 601.0 | 595.0 |
| 1-mile ocean swim with fins (mins.) | 43.5 | 41.8 |
| 4-mile run (mins.) | 29.7 | 29.9 |
| Math inventory (%) | 70.5 | 76.0 |
| Diving physics exam (%) | 74.3 | 76.7 |
| Demolitions exam (%) | 83.6 | 83.9 |

RELATION BETWEEN ATTRITION AND INSTRUCTOR/LEADER SELECTION AND TRAINING

Method

To determine how the selection and training of instructors and student leaders affected attrition, researchers observed all training evolutions for classes 101 and 102. This covered the period from September 1978, when class 101 began indoctrination training, until May 1979, when class 102 graduated. Also, they analyzed data obtained during interviews conducted during the Hellweek investigation.

Results and Conclusions

Observational data indicated there was considerable variability in the leadership abilities of class leaders. Also, some student leaders indicated that they were not adequately prepared for their responsibilities and needed some additional training. In addition, the impact of the coxswain on attrition is particularly evident during boat maneuvers, which are stressful, demanding of teamwork, and even hazardous. Many of the students who voluntarily dropped while engaged in night rock portage during Hell-week indicated they had "no confidence" in their coxswain and, consequently, didn't want to undergo a hazardous training evolution with him. In contrast, other students who completed the training evolution reported that their coxswain was responsible for their completing the exercise.

The Navy and Marine Corps has established specialized training programs for Navy company commanders and Marine Corps drill instructors (DIs) in recognition of the important role they play in transitioning recruits from civilian life to military combat training. It appears that this same rationale should be applied to the development of training programs for BUD/S instructors, who are responsible for transitioning students from less strenuous Navy tasks into combat swimmers under conditions of high demand and stress.

Evidence concerning the impact of instructor selection was found in a study conducted by Standlee and Abrahams (1980). In this study, the authors attempted to develop and validate selection procedures that would assist in more accurately predicting the success of prospective Marine Corps DIs. Results showed that volunteer status, General Classification Test scores, and level of education were the best predictors of DI school performance, and that DI school performance, in turn, was the single best predictor of DI job performance. Thus, it appears that improved selection criteria for BUD/S instructors would not only improve their performance, but also lead to reduced attrition rates for BUD/S.

Recommendations

1. Instructors who are selected for BUD/S should have the following characteristics/traits:
 - a. Volunteer for BUD/S assignment. Instructors who are truly volunteers for BUD/S are probably highly motivated to train young men to become part of their profession.
 - b. History of High Performance. Only personnel with high performance evaluations should be sent to BUD/S. While performance in operational units may not be indicative of effectiveness as instructors, it probably reflects a high degree of military professionalism.
 - c. UDT/SEAL Careerist. Instructors should have maintained continuous service in the UDT/SEAL community and have remained certified in their proper NEC designator. (This issue is addressed in a NAVPHIBSCOL letter, Serial 1137 of 7-27-79).
 - d. Broad Operational Background. Since the BUD/S curriculum encompasses a broad area of training, it is important that instructors have at least one tour in both a UDT and a SEAL team. This experience would enable instructors to understand the overall training program and how to prepare BUD/S students for their future careers.

e. Adequate performance as a BUD/S Student. Staff interviews revealed that some instructors who had considerable performance problems when they were a BUD/S student usually wanted to make training "tough" for all students. Others believed that such instructors often were better qualified to train, counsel, and motivate students. Further investigation is necessary to resolve this issue.

f. Sufficient Pay grade. Instructors with extensive interactions with students should be an E-5 or higher. This would ensure that the instructor has the requisite training, expertise, and experience to instruct as well as to discipline the students, some of whom are E-5s themselves.

g. BUD/S not terminal tour of duty. Instructors should be required to serve at least one more operational tour with UDT/SEAL teams after BUD/S. This requirement would ensure that persons with low motivation are not assigned to BUD/S.

2. A specialized training program should be developed for training BUD/S instructors. The Navy's Instructional Training (IT) and Leadership Management Education and Training (LMET) courses can meet some of the BUD/S training requirements. IT is valuable for training instructors in preparing and delivering classroom lectures, but its usefulness is limited in BUD/S, where much of the curriculum is taught in field exercises and practicums. LMET can provide a broad training orientation to instructors, but does not encompass important areas. Therefore, a program should be implemented within BUD/S or the Naval Amphibious School (NAVPHIBSCOL) that would teach instructors how to train students who are undergoing stressful evolutions. The areas to be emphasized in such a program include:

a. Adaptation to high physical and mental stress. Instructors should be taught how to relate to students under extreme stress and how to help them cope with the training environment.

b. Small group leadership and cohesiveness. It is evident from student interviews that the leadership ability of the coxswain and student officers influence the morale and group dynamics of boat crews. Consequently, the instructors should be taught to understand how their decisions impact on students (e.g., leading the boat crews). Further examples of small group leadership problems are found in the Hellweek section.

c. Motivation and performance enhancement of BUD/S students. Instructors should be trained in the following motivational techniques:

(1) Reinforcement principles, including determining what rewards are important to students (e.g., verbal reinforcement, rest periods), and how rewards relate to desired performance.

(2) Feedback mechanisms in which objectively measured performance is communicated to students and compared over time. This technique works best when the feedback is given in a timely manner and presented visually.

(3) Goal setting, which includes not only those principles from the previous two techniques, but also training in how to provide assistance in establishing long- and short-term performance goals that should be realistic, meaningful, and measurable.

3. A centralized training program should be developed for Special Warfare instructors. BUD/S instructor training must be effective, efficient, and affordable. Given other

manpower and logistical considerations, it is recommended that specialized training be provided at a common site to all instructors in the UDT/SEAL, explosive ordnance disposal (EOD), and Navy diver (ND) communities. The reasons for developing a common delivery system for training are listed below:

a. Overlap of training requirements. The BUD/S curriculum has substantive overlap with several parts of the ND and EOD communities (diving, demolitions, etc.).

b. Centralized control over manpower distribution functions. Since the primary source of control over staffing levels and personnel rotation for the UDT/SEAL, EOD, and ND communities is within the Naval Military Personnel Command (NMPC-401), it would be feasible to assign personnel at intervals so that a sufficient number of instructors could be trained at once.

c. Implications for budgetary constraints. A centralized system of instructor training would result in a more efficient use of resources.

d. Information sharing among Special Warfare communities. Interactions among instructors from the different communities would have the long-range operational benefit of providing each instructor with insight into the functional relationships of their respective communities.

4. Student leaders (officers and petty officers) should be assigned to BUD/S several weeks before indoctrination. Student leaders, including coxswains, require training in: (a) physical conditioning, (b) technical skills (e.g., setting up, launching, and retrieving the crew boats), (c) leadership training, and (d) orientation to BUD/S procedures and curriculum. Since the officers and petty officers provide examples for the students, it is important that they be well prepared for the rigors of training. If the leaders are struggling with training evolutions, they will not be able to help the students. Also, the level of confidence the students have in their leaders will be reduced.

5. At least one officer and several petty officers should be assigned to each BUD/S class. Since strong leadership is an important factor in attrition and performance, classes should have adequate leadership even if it means holding some officers over until a new class is formed.

6. Student leaders should take the LMET course before training. LMET should be a required course for student leaders as well as instructors, even though it is not sufficient. Even if a specialized BUD/S training course were established, leaders would still benefit from portions of the LMET course.

7. Student leaders should be provided with a set of management options. The student leaders indicated that they had considerable responsibility for the class but little authority. In fact, responsibilities were rarely outlined to the leaders, with the instructors assuming that "good leaders" know and understand what is expected of them. For example, although the leader is criticized if his men are late for an evolution, he cannot use disciplinary actions, such as restriction, to help ensure that the men realize the consequences of their actions. Also, the coxswains generally felt that the only methods they could use to motivate their men were to become "superior" examples or to rely on their interpersonal skills, a difficult task under demanding conditions. The intent of this recommendation is not to circumvent the chain of command but, rather, to provide a mechanism for including the class leaders as part of the process.

8. Criteria for leadership skills should be developed. Student officers may not always be adequate leaders, even though they are performing the training evolutions quite

well. A method whereby BUD/S can objectively measure leadership performance needs to be developed and incorporated into the management procedures. In this way, pretraining can be better developed and students who are not demonstrating leadership skills consistent with their pay grades can be rolled back or dropped from the program, depending upon the extent of their deficiencies.

9. Motivational techniques should be taught as part of pretraining. Student leaders, like instructors, should be instructed in motivational techniques that may lead to improved performance. The techniques to be taught should include: (a) reinforcement principles, (b) feedback mechanisms, and (c) goal setting.

10. The proctor and the class leaders should hold daily meetings. There are two purposes in setting up daily meetings. First, leaders can receive feedback on their inadequate performance or that of their men in a less public environment, thereby not undermining their authority. Second, the training schedule can be reviewed to provide information that may help clear up inaccurate expectations regarding training evolutions.

DISCUSSION AND CONCLUSIONS

Student Selection

For the 2-year period from January 1979 through December 1980, 74 percent of BUD/S applicants were selected for training (a selection ratio of .74). Of these, 24 percent did not satisfy screening standards and were admitted through waivers. Virtually all waivers were granted as a result of deficiencies in ASVAB scores.

Given the BUD/S selection ratio of .74, it appears that student attrition can be decreased by adjusting or adding to existing screen test items (see Table 3). For example, since ASVAB waivers were found to be poor candidates for BUD/S training, it appears that the practice of granting waivers should be discontinued. Also, the graduation rate of students who performed poorly on the physical screening test was relatively low. Waivers are not granted for performance on this test, since few applicants have difficulty in satisfying minimum requirements. Given the extraordinary physical demands of BUD/S training, it appears that the selection cut-scores on physical screening test items do not adequately discriminate between applicants who are physically qualified and those who are not. Additionally, since the mathematics inventory score and prior scuba experience were found to be potentially useful selection variables, consideration should be given to including them.

The employment of additional or more rigorous selection test cut-scores, however, is dependent on the size and quality of the available applicant pool. The BUD/S selection ratio for the past 2 years (.74) demonstrates that the number of BUD/S applicants is not sufficient to support wholesale adjustments to selection standards. Indeed, the large number of ASVAB waivers in the test sample (25%) indicates the lack of qualified applicants. For this reason, the first priority in counterattrition management must be to improve recruitment procedures to attract more qualified applicants.

Other Special Warfare training programs also have high attrition rates. For example, the EOD School currently experiences a 50 to 70 percent attrition rate and fleet EOD billets are manned at only 76 percent of authorized force. The similarity of EOD and BUD/S training problems indicates the particular need for Special Warfare recruitment to provide sufficient numbers of exceptionally qualified trainees.

Nonetheless, the validity of screening test items in predicting BUD/S training success suggests that the most cost-effective strategy may involve the utilization of more rigorous field selection criteria. As Figure 1 demonstrates, 26 percent of the applicants who satisfied selection standards and were admitted to BUD/S attrited before Phase I training began, compared to 24 percent who ultimately graduated. Given these large numbers of "pretraining" attrites, the use of field-screening cut-scores that improve the ratio of BUD/S graduates to attrites will not necessarily reduce the actual numbers of BUD/S graduates. In addition, recent improvements in UDT/SEAL fleet manning levels (100% expected by June 1981) may reinforce the practicality of controlling BUD/S attrition with the use of student selection criteria. That is, losing potential graduates through rigorous selection standards becomes a moot issue if sufficient numbers of BUD/S graduates are being supplied to the fleet.

It should also be pointed out that the statistical estimates of reductions in attrition rates presented in Table 3 are fundamentally conservative. First of all, the statistical validity of screening test items was limited by the fact that the experimental sample did not include BUD/S applicants who were not admitted because of unsatisfactory performance on field screening tests (except for low ASVAB performers). Second, many low screening test performers attrited before or very early in indoctrination training and were not present for test administration. Third, the screening test validity may have been further diminished by the fact that the attrition rate for classes 103-105 was unusually low (30%). The demonstrated validity of selection variables to predict attrition/graduation in a low attrition test sample attests to the power and utility of screening measures in BUD/S selection procedures.

The foregoing problems with test and evaluation design point to the importance of an ongoing need for BUD/S to monitor the relationship between the number of applicants, selection criteria, and attrition/graduation statistics. Selection criteria must be flexible enough to account for varying fleet manning and training requirements and the uncertain availability of sufficient numbers of qualified applicants.

Hellweek Intervention

Although BUD/S attrition was reduced considerably following the Hellweek intervention, attrition and performance measures of additional classes must be monitored to determine whether these reductions will continue over time. This is particularly important because, while implementing the intervention, management made several procedural changes, some of which required behavioral changes by the instructors. Also, instructors need to be given feedback on student performance and attrition so they can assess their effectiveness. In fact, it would be beneficial if, prior to the start of a new Hellweek, instructors were given feedback as a group. Such a feedback session could be used to initiate planning for future Hellweeks.

Because of the probability that Hellweek procedural changes might lose their effectiveness over time, a high priority should be to establish Hellweek goals that reflect the philosophy of BUD/S training. In this process, it is important that:

1. The goals are developed by the BUD/S director, with input from his staff.
2. The goals are discussed with the staff members in Phase I to ensure that the staff members understand and accept them.
3. The goals are translated into practices and operating procedures.

4. These procedures are documented and institutionalized by BUD/S.
5. The effects of the changes are monitored.

The extent to which changes in Hellweek procedures are effective in reducing attrition depends on the extent to which these changes are accepted by all staff levels at BUD/S. The longevity of the effects obtained depends upon the extent to which these changes are institutionalized and monitored and minor adjustments are incorporated into the system.

Leader Selection and Training

The recommended changes in instructor selection criteria need to be evaluated to determine how useful they are in systematically selecting effective instructors. The first step in this evaluation is to identify the desired outcome measures (instructor performance evaluations, overall class performance, etc.). Second, the relationship between instructor selection criteria and outcome measures must be identified, and third, these relationships must be validated over time. In addition to the required statistical testing procedures, there are also management implications. For example, management must understand that changes in instructor selection procedures cannot be validated until they have been tested for at least 2 or 3 years. Since one third of the instructors rotate each year, data must be collected on a large number of instructors. BUD/S managers must decide whether the potential gain of graduating more students is worth the investment.

In terms of developing a specialized training program for instructors and, to a lesser extent, for student leaders, the most significant consideration is setting up a centralized training course. Logically, since BUD/S is part of the Naval Amphibious School (NAVPHIBSCOL), that might be a feasible location. However, it is recognized that high level Navy approval and coordination are necessary to establish a centralized course. Therefore, if establishing such a centralized course is not feasible, BUD/S should concentrate on improving its program as recommended.

Technical experts in the areas of stress, small group leadership, and motivation are necessary to develop curricula. If such experts are not available at NAVPHIBSCOL, outside expertise may be necessary.

In order to measure objectively the effectiveness of a specialized training program and proposed changes, BUD/S should consider establishing a management information system (MIS) for systematically collecting data on students and instructors. A MIS could provide timely and meaningful information on how changes in the curriculum (e.g., reversal of Phases II and III) or in the admissions policy (e.g., suspension of ASVAB waivers for a specified time period) affect BUD/S training and/or attrition. The MIS should include training effectiveness measures (e.g., student performance, attrition, injuries, etc.) for evaluating program changes.

RECOMMENDATIONS

Recommendations are included in the various sections and are listed in the summary.

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