

An Example of Assessment's Role in Career Exploration

Janet E. Wall

A new ASVAB (Armed Services Vocational Aptitude Battery) 18/19 Career Exploration Program was made available to United States secondary and postsecondary schools in July 1992. The program allows individual students to use their aptitude test results, an inventory of their interests, and personal preferences to identify occupations with characteristics that seem to be consistent with their own. This capability of matching student characteristics to occupations is derived from extensive analyses based on work performed by the U.S. Departments of Labor and Defense.

Since July 1992, the ASVAB (Armed Services Vocational Aptitude Battery) 18/19 Career Exploration Program has been available for use in both secondary and postsecondary schools. This article highlights the major components of this new program, explain the analyses that formulated the technical underpinnings for the program, and briefly describe the associated support materials.

The ASVAB Career Exploration Program is provided for the dual objectives of furnishing information to schools to foster civilian and military career exploration by students and identifying aptitude-qualified youth who may wish to enlist in the military. The Defense Manpower Data Center, publisher of this program, believed that the objectives would be best met by providing United States secondary and postsecondary schools with a high-quality program that could be the foundation for a comprehensive career exploration program. On the advice of a panel of career counseling experts, important components are included in this new program that should prove to be highly useful to career counselors and other educators as they assist young people in exploring both civilian and military occupations (Booz-Allen & Hamilton, Inc., 1988).

Although the ASVAB test battery has been available to schools since 1968, this 1992 program includes additional capabilities and new aspects that should greatly contribute to the career development of high school youth. For example, for the first time, the ASVAB program links a verbal and mathematics composite score, called "Academic Ability," to the cognitive demands of occupations so that students can identify occupations that have characteristics congruent with their test results. Test scores, more detailed than in past programs, are provided to students through the reporting of test results in 10 academic and technical areas. Additionally, this program now incorporates an interest inventory to assist students in relating their dominant interest areas with occupations that tend to allow those areas to be expressed.

CAREER EXPLORATION COMPONENTS

Blustein (1993) indicated that basic career exploration involves activities that attempt to relate knowledge of self to the external world. In practical application, this means providing information to students on their aptitudes, interests, and values and attempting to match that information to characteristics of specific occupations. Aptitude,

interests, and values are important components in the self-knowledge facet of career development, and their use is supported by the American School Counselor Association (ASCA, 1981).

The ASVAB Career Exploration Program enhances a student's self-knowledge by providing information on (a) aptitudes, as measured by the ASVAB; (b) interests, as indicated by the Self-Directed Search (SDS), published by Psychological Assessment Resources, Inc.; and (c) personal preferences, as reported by the students. The program assists students in obtaining and organizing that information and then linking it to characteristics of occupations. The remainder of this article describes the content of each of the career exploration components and explains how those components are linked to occupations.

Aptitude—The ASVAB

The ASVAB is a multiaptitude test battery composed of 10 short tests in the following areas:

1. General Science
2. Arithmetic Reasoning
3. Word Knowledge
4. Paragraph Comprehension
5. Numerical Operations
6. Coding Speed
7. Auto and Shop Information
8. Mathematics Knowledge
9. Mechanical Comprehension
10. Electronics Information

The test battery was normed in 1980 on a nationally representative sample of individuals, and subsequent forms have been equated to the original reference test battery used in the norming study. National comparisons are available for students in grades 10 to 12 and in postsecondary schools. More than 170 studies have been conducted showing the ASVAB's validity for predicting high school course grades, training grades, and performance on the job (Welsh et al., 1990).

Reporting test results. Answer sheets from testing sessions are scored at 1 of 67 local scoring sites situated throughout the country, and results are returned to participating schools within about 2 weeks of test administration. Along with their score reports, students receive an array

of interpretive information useful for planning future training and education and for realistically considering various career options.

In addition to providing scores for all 10 ASVAB tests, results from the Word Knowledge and Paragraph Comprehension tests are combined to report a Verbal Ability score, while results from the Mathematics Knowledge and Arithmetic Reasoning tests are combined to report a Math Ability score. These two composite scores are further consolidated into a general developed-ability composite score called "Academic Ability."

Student scores are reported as percentiles, comparing each student's performance with a nationally representative sample of students in the same grade, for the same sex and for the opposite sex. In addition to percentiles, score bands depicting one standard error of measurement on either side of the percentile point for same-grade and same-sex percentiles are graphically displayed on the score report. Comparisons with reference groups of the same and opposite sex are supplied in the recognition that boys/men and girls/women may have differing backgrounds in certain areas measured by the ASVAB. Reporting scores in this way is believed to encourage individuals to expand their scope of career alternatives. Two additional scores, designed specifically for career exploration, are also listed on the student's score report: the ASVAB Code and the Military Career Score.

Deriving and assigning ASVAB codes. The general developed ability composite score, called "Academic Ability," is the principal aptitude measure linked to occupations and used in the career exploration program. The ASVAB Code is based on the Academic Ability percentile distribution, which is divided into five groupings according to the following scheme:

ASVAB Code	Percentile Grouping
ASVAB Code 1	Percentiles 90–99
ASVAB Code 2	Percentiles 70–89
ASVAB Code 3	Percentiles 50–69
ASVAB Code 4	Percentiles 30–49
ASVAB Code 5	Percentiles 1–29

These codes are linked to the cognitive complexity of occupations and help students proceed with the career exploration process by finding occupations with cognitive demands similar to their own current capabilities.

The student is given two codes that approximate the individual's ability levels. The first, or primary code, is determined by which of the five divisions of the percentile distribution contains the individual's reported percentile score. For example, if a student obtains an Academic Ability percentile of 75, Code 2 is assigned. Likewise, a percentile of 44 would translate to Code 4. The secondary code is the code immediately above or below the student's primary code. It is determined by the positioning of the student's percentile point in either the top or bottom half of the percentile grouping. For example, in addition to being assigned a Code 2, a student scoring at the 75th percentile would be assigned a secondary code of 3 because 75 is in the bottom half of the percentile range of 70–89. Had the individual obtained a percentile in the top half of the distribution (80–89), a secondary code of 1 would have been assigned.

Reasons for assigning two aptitude codes include (a) the recognition of measurement error inherent in any test, (b) the fact that incumbents working successfully in a given occupation will span a wide range of ability levels, and (c) the understanding that with additional educational effort, students may be able to increase their scores. These factors should be considered in a program that seeks to encourage the thoughtful and

realistic consideration of a wide range of career alternatives. Providing two codes also expands the range of occupations for further exploration.

Student Interests—The SDS

Student interests are characterized by responses to questions on the SDS, an interest inventory that is a major part of the ASVAB program. The SDS uses a series of items asking students to indicate their (a) likes or dislikes of certain activities, (b) possession of certain competencies, (c) affinity toward certain occupations, and (d) self-ratings in 12 ability areas. By self-scoring the items, students are able to distinguish their primary, secondary, and tertiary interest codes from the six vocational personality (RIASEC) types associated with Holland's theory (Holland, 1985). Interpretive materials provided by the ASVAB program assist students in understanding the nature of each vocational personality type and its distinctive characteristics. The student's three dominant interest codes are used in a recommended career exploration process, with the primary interest code's being given the heaviest weight.

Personal Preferences

The ASVAB Career Exploration Program acknowledges the significance of personal preferences and incorporates them in to the process of searching for compatible and satisfying occupational alternatives. Only tentative conclusions on the importance of these personal preference are advocated to allow for reexamination of the initial decisions, leading to more thoughtful consideration of career options. Personal preference variables include amount of education one is willing to pursue, interest in occupations in the military, and work values.

Students specify their educational goals by stating how much education they are willing to pursue beyond high school. Options reflect completion of a graduate degree, a 4-year college diploma, up to 3 years of education beyond high school, or no additional education beyond high school. Also, students indicate whether or not they are interested in investigating occupations available in the military.

Work values selected for inclusion in the ASVAB Career Exploration Program include the following:

1. Challenge
2. Creativity
3. Helping Others
4. Income
5. Independence
6. Preference for Outdoor Work
7. Prestige
8. Public Contact
9. Security
10. Variety
11. Working in a Group
12. Little Physical Activity
13. Physically Challenging Activity

Students select up to four work values that they would want an occupation to satisfy and use these selections in exploring characteristics of tentative career choices.

LINKING STUDENT FACTORS TO OCCUPATIONS

The technical underpinnings to the career exploration process used in the ASVAB program are based on linking characteristics of people to similar characteristics of occupations. The model used for these linkages is depicted in Figure 1.

Basically, student aptitudes are linked to the cognitive demands of occupations, interests are linked to the dominant interest areas exhibited

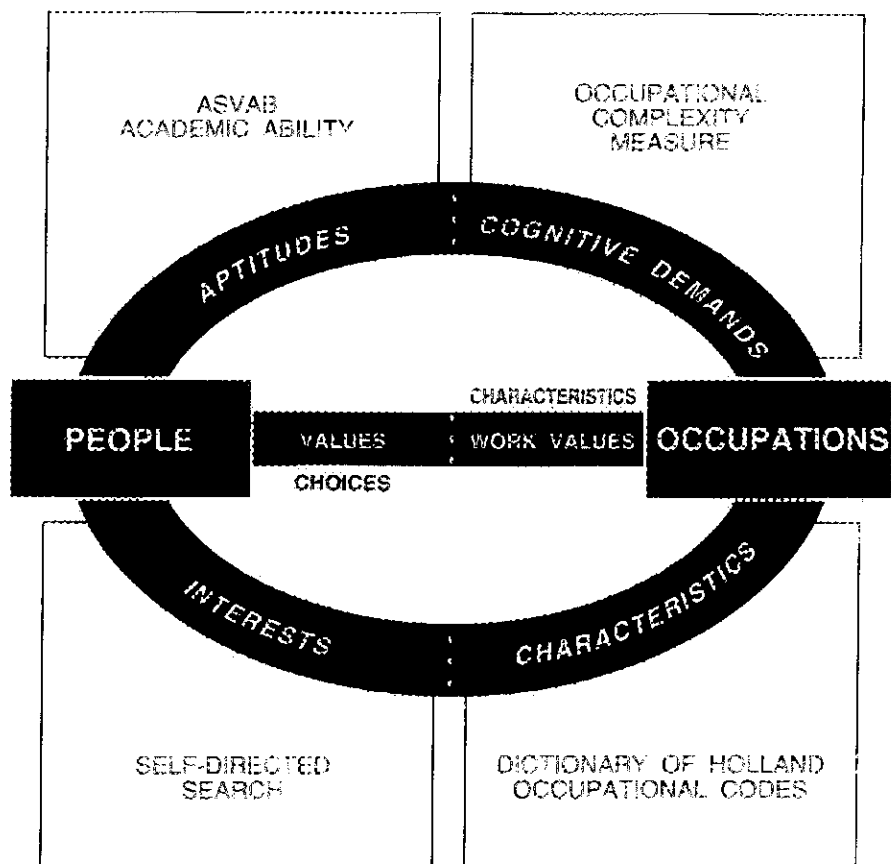


FIGURE 1

Career Exploration Model

by occupations, and student personal preferences are linked to the characteristics of occupations that tend to allow certain work values to be satisfied.

In all, two aptitude codes, three interest codes, and up to six personal preferences are used to match student characteristics with comparable characteristics of occupations. The matching of characteristics takes place through the completion of an exercise within the ASVAB program called the "OCCU-FIND." The OCCU-FIND is a fold-out matrix chart with a horizontal axis listing more than 200 occupations and a vertical axis of factors describing the student (i.e., aptitude, interest, personal preferences). The chart embodies a latent-image printing technique: When a student uses a special pen to highlight a row representing one of his or her characteristics (e.g., an interest code of Enterprising, or an ASVAB Code of 2), a star appears on the chart for each characteristic that is present in an occupation. A portion of a completed OCCU-FIND is presented in Figure 2. Each star represents a linkage of a characteristic to an occupation.

Selecting Occupations

Occupations for inclusion in the OCCU-FIND were selected from two sources: the U.S. Department of Labor's *Occupational Outlook Handbook* (OOH; 1992) and the U.S. Department of Defense's *Military Careers* (1992). All occupations listed in these two publications were

considered for incorporation into the program. A panel of experts, familiar with civilian and military occupations, reviewed the potential list of occupations and their characteristics and selected more than 200 occupations for inclusion in the ASVAB Career Exploration Program. The occupations were chosen because they (a) represent the range of diversity in the world of work; (b) focus on occupations of potential interest to secondary and postsecondary students; (c) represent either civilian or military occupations, or both; (d) reflect occupations with varying entry-level requirements; and (e) are likely to be in demand over time.

Linking Occupations to ASVAB Codes

The U.S. Department of Labor's *Dictionary of Occupational Titles* (DOT; 1977, 1982, 1986) includes a data base of occupational attribute variables. This was used as the foundation for determining the complexity or cognitive demand of an occupation. Based on work reported by Gottfredson (1982), the variables of Data (a worker function), GED (general educational development), SVP (specific vocational preparation), Intelligence (an aptitude rating), Verbal (an aptitude rating), Numerical (an aptitude rating), and Repetitive or Continuous process (a temperament rating) were used to calculate an Occupational Complexity Measure (OCM) for each DOT-level occupation. These OCMs were then grouped into the broader clusters of occupations found

		ENTERPRISING																																				
Interest Codes	R - Realistic																																					
	I - Investigative																																					
	A - Artistic																																					
	S - Social																																					
	E - Enterprising	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	
	C - Conventional																																					
ASVAB Codes	ASVAB 1		★		★			★			★				★																					★		
	ASVAB 2			★			★	★			★	★	★	★		★	★	★	★	★	★	★	★	★					★					★	★			
	ASVAB 3																																					
	ASVAB 4																																					
	ASVAB 5																																					
Interest/Ability Match			⊗	X		⊗	X	X	⊗		X	⊗	X	X	X	⊗	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	⊗	X		
OCCU-FIND		OCCUPATIONS	Chef																																			
			Communications Managers																																			
			Detectives and Special Agents																																			
			Dispatchers																																			
			Economists/Market Researchers																																			
			Education/Training Administrators																																			
			Emergency Management Officers																																			
			Financial Managers																																			
			Flight Attendants																																			
			Food Service Managers																																			
			Foreign Service Officers																																			
			Hotel Managers																																			
			Human Resources Managers																																			
			Insurance Sales Workers																																			
			Lawyers and Judges																																			
			Loan Officers and Counselors																																			
			Management Analysts/Consultants																																			
			Managers and Executives																																			
			Postmasters																																			
			Public Relations Specialists																																			
			Purchasing Agents and Managers																																			
			Real Estate Agents/Brokers/Appraisers																																			
			Retail Sales Workers																																			
			Service Sales Representatives																																			
			Special Operations Personnel																																			
			Stock Brokers																																			
			Store Managers																																			
			Transportation Managers																																			
		Minimum Civilian Education Beyond High School																																				
		No Further Education																																				
		Up to Three Years																																				
		Bachelor's Degree																																				
		Graduate Degree																																				
		Military Occupations																																				
		Work Values																																				
Personal Preferences	Challenge				★		★		★	★			★			★		★	★																		★	
	Creativity																																					
	Helping Others																																					
	Income																																					
	Independence		★		★									★		★	★			★																	★	
	Outdoor Work																																					
	Prestige																																					
	Public Contact				★			★	★		★			★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	
	Security																																					
	Variety				★			★	★				★	★	★				★	★	★						★	★	★			★		★		★		
	Working in a Group																																					
	Little Physical Activity																																					
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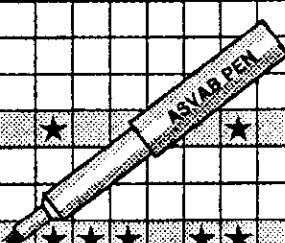


FIGURE 2

Portion of the OCCU-FIND Chart Used by Students in Exploring Career Options

on the OCCU-FIND. Each occupation was assigned a code of 1 to 5 based on its OCM score; assignments were examined and validated by a panel of experts. Additionally, a calibration of the ASVAB and the General Aptitude Test Battery (GATB) served to verify the matches between the ASVAB percentile distributions and the OCM for the occupational cluster.

Linking Occupations to Interests

The *Dictionary of Holland Occupational Codes (DHOC)* (Gottfredson & Holland, 1989) was used as the basis for assigning an interest code to an occupation. The *DHOC* assigns a three-letter code to each of the 12,000-plus occupations found in the *DOT*. An analysis of the Holland codes at the *DOT* level of specificity was undertaken for each occupation in the OCCU-FIND, and each occupation was assigned a single Holland interest code. The assignment was made according to the frequency of the primary interest code listed in the *DHOC*. Each of these linkages was subsequently reviewed and validated by a group of occupational experts.

Linking Occupations to Personal Preferences

Personal preferences were defined as education, military occupations, and work values. These factors—the amount of education a person is willing to obtain, whether or not an occupation exists in the military, and the 13 work values—were linked to each of the occupations. When possible, available data were used to determine the connection between a personal preference and an occupation. For example, information in the *OOH* providing a discussion on the amount of education generally required for entry into a particular occupation was used to assign an education level to each occupation. Information in the *OOH* was also used to ascertain which occupations were associated with high income. Information in the *DOT* was used to assign linkages among outdoor work, little physical activity, and physically challenging work. These sources were used for occupations that were both solely civilian and those with military counterparts. For those occupations that were solely military in nature, a resource called the *Military Occupational and Training Data* (Defense Manpower Data Center, 1992c) was used to assist in making the linkages.

The remaining work values were linked to occupations based on the judgments of a panel of subject-matter experts. For each of the 200 occupations, panel members determined if the occupation would satisfy (or not) a person with a strong desire to fulfill a particular work value. When at least six of seven panel members agreed that an occupation would probably satisfy a work value, the occupation was linked to that value.

HOW STUDENTS USE INFORMATION TO EXPLORE CAREERS

Students use a workbook titled *Exploring Careers: The ASVAB Workbook* (Defense Manpower Data Center, 1992d), along with the OCCU-FIND chart, to guide them through the process of relating their ASVAB results and other personal characteristics to occupations that are consistent with those characteristics. They use their ASVAB codes, interest codes, and personal preferences to select a group of relevant occupations from the entire listing of 200 that appear on the OCCU-FIND. The career exploration process accentuates the prominence of abilities and interests over personal preferences, and it acknowledges the importance of the

primary aptitude code and primary interest area above the subsidiary ones.

After completing their initial process, students are advised to revisit some of their personal preference decisions if a relevant occupation matching their aptitude and interest codes is missing an important work value. They are prompted to examine why a certain occupation in which they had an interest failed to meet their criteria. Suggestions are made to revisit the OCCU-FIND repeatedly until the students have each developed a list of occupations that seem to match their individual profiles. These are the occupations that students may wish to explore further.

EXTENDING CAREER EXPLORATION

A variety of information sources is recommended to students. The two most directly connected to the ASVAB Career Exploration Program are the *OOH* and *Military Careers*. For each of the occupations included in the program, *OOH* and *Military Careers* page numbers are listed in the student workbook. This provides easy reference for locating additional details on any occupation.

Using the Occupational Outlook Handbook

The *OOH* is a reference that provides details on approximately 250 occupations. A comprehensive resource found in most school and public libraries, it describes approximately 90% of all jobs in the U.S. economy, delineating various attributes of the occupations.

Using the Military Careers

Military Careers is the definitive career information resource on military occupations. Organized into four sections, the document lists information on approximately 200 enlisted and officer occupations. The first section presents basic information about occupations in the military such as height and weight requirements, pay scales and benefits, types of training and education available, and retirement benefits. The second includes specific information on each of the armed services. The third describes each of the enlisted and officer occupations, including the nature of the work, its physical demands, helpful attributes, and training provided. For each enlisted occupation, a graph is provided to help the student determine his or her probability of qualifying for one or more of the specialties within a particular occupation. The graphs employ the use of the *Military Careers* score, a composite of 6 of the 10 ASVAB tests.

The final section offers students insight into the variety of activities and responsibilities experienced by those who have chosen a career in the military. Sections included in this last portion of the document include duty assignments, advancement, and typical activities and responsibilities over a 20-year career path. Career profiles, developed from interviews of enlisted and officer personnel, present an insight into life at typical duty stations, levels of increasing job responsibility, and personal reflections on time spent in the military. This affords the students an opportunity to reflect on the life-styles, responsibilities, and personal and professional attributes of enlisted and officer personnel.

ASSISTANCE TO THE COUNSELOR

To assist school personnel in incorporating the ASVAB 18/19 Career Exploration Program into their own career counseling programs, three additional publications are provided: the *ASVAB 18/19 Counselor Manual* (Defense Manpower Data Center, 1992a), the *ASVAB 18/19 Educator and Counselor Guide* (Defense Manpower Data Center, 1992b), and

the *ASVAB 18/19 Student and Parent Guide* (Defense Manpower Data Center, 1992c).

Counselor Manual

The resource of primary importance to the school counselor is the *ASVAB 18/19 Counselor Manual*; it describes the features of the ASVAB Career Exploration Program in detail. Produced with the guidance and advice of the American Counseling Association, it gives assistance in (a) organizing the ASVAB test sessions, (b) understanding the composition of the ASVAB, (c) interpreting ASVAB results, and (d) interpreting the results of the SDS. An overview of technical information on the ASVAB and the SDS serves to provide the counselor with the basic knowledge required to understand the capabilities and limitations of the measurement instruments used in the ASVAB Career Exploration Program. Additionally, the manual suggests various approaches by which the counselor can interpret the ASVAB results with the intent of reaping maximum benefit under a variety of conditions.

Two sections of the *ASVAB 18/19 Counselor Manual* are particularly worth noting. First, several case-study scripts are included in the manual. These case studies typify situations that a counselor is likely to encounter while assisting the students in interpreting and internalizing their own test results. Second, to help introduce career exploration activities into the school setting, various exercises and activities are suggested. Many of these are designed for use not only by the career counselor but also by classroom teachers and parents. Certain aspects of career exploration and career decision making can be best illustrated by the use of these lesson plans and supplementary exercises.

Using Other Counselor Resources

The *ASVAB 18/19 Educator and Counselor Guide* can be used to inform teachers, school administrators, and school board members of the nature and quality of the ASVAB Career Exploration Program. The *ASVAB 18/19 Student and Parent Guide* is designed to familiarize students and parents with the value of the ASVAB Career Exploration Program in helping make decisions about future work, education, and training. This pamphlet describes the test battery's content and the nature of specific test items. Questions typically asked by students and parents about the test are answered, and practice test items are presented.

SUMMARY

The ASVAB Career Exploration Program is a comprehensive, integrated program that can be used as a foundation for more extensive career counseling of secondary and postsecondary school students. The program uses measured aptitude and interest information, along with self-reported personal preference data, to help students identify occupations that have comparable occupational characteristics. The linkages between the characteristics of people and the characteristics of occupations are based on technical underpinnings developed from extensive research and analysis. It is the intent of the program for students to (a) explore civilian and military careers using a method based on sound and thorough data, (b) consider occupations that they may not have otherwise contemplated, and (c) learn the basic skills of career exploration that can be useful over a lifetime.

The various components of the ASVAB Career Exploration Program were formulated with the assistance of career counseling experts,

career development researchers, psychometricians, and findings developed through student and counselor focus groups and field tests. To determine if the ASVAB Career Exploration Program is serving its intended purposes, however, the Defense Manpower Data Center is conducting an extensive and comprehensive evaluation over the next few years. Findings from this evaluation, along with new knowledge available through the work of career development researchers and practitioners, will be used to produce future ASVAB programs.

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