

## DEVELOPMENT OF A SELF-ADMINISTERED COMPUTERIZED VOCATIONAL ASSESSMENT SYSTEM

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Abstract

With the advent of the microcomputer have come many creative applications of technology. In the area of vocational evaluation, computers have been used for administering tests, for recording, scoring and interpreting data, for producing reports, for retaining test data and for performing statistical analysis of large datasets. KEVAS, an acronym for Key Education Vocational Assessment System, was designed to provide all of these capabilities.

KEVAS technology resulted from the integration of test devices and materials into a computerized test station. The KEVAS unit consists of a microcomputer, coupled with specialized test hardware. Self-administration, scoring and interpretation of raw data, storage of individual demographic data and on-site printout of results from thirteen test areas are provided.

The group database which KEVAS maintains may be utilized for providing descriptive statistics or to identify areas of group need and functional strength. This information may be used in program development or to identify needed support services. Group data analysis has also been demonstrated as an aid in instructional modification, educational/vocational program development and/or evaluation, basic research, and economic development.

The goal of vocational assessment is to identify the performance capabilities of the individual, so as to match these abilities to the requirements of an occupation or training program. When an individual's performance profile is matched effectively with the functional requirements of the vocational option using a "goodness of fit" model, an optimal placement results and potential for success, for both the client and the employer or training provider, is enhanced. Utilizing computer technology to accomplish this matching process enables the user to achieve a high degree of consistency and precision.

In his introduction to Witkin's work in perceptual psychology (1954), Gardner Murphy described the research as a search to integrate performance elements, as evidenced by perceptual tasks, with personality attributes. Indeed, Witkin and his colleagues did demonstrate the relationship between specific personality factors and corresponding patterns of performance on perceptual tasks.

A question which may arise, however, is whether personality characteristics and perceptual performance patterns are linked to job functioning. We have postulated that perceptual style and personality attributes are elements which are linked to job performance and we have attempted to construct an assessment system for measuring these factors in a direct and quantifiable manner.

In an earlier work (Penfield, Krass and Conlon, 1984) elements of The Key Education Vocational Assessment System were described and reliabilities for the test components were reported as ranging from a low of .63 to a high of 1.00. Research utilizing the Key System has demonstrated that it effectively predicts job performance potential in an unbiased fashion with regard to age, gender, sex or ethnicity (Penfield, Krass, and Conlon, 1985).

George Miller, (1983) in reviewing Gardner's Theory of Multiple Intelligences lists those mental faculties which identify "different kinds of intelligence". Most major tests measure "verbal intelligence" and what is described as "performance intelligence."

We postulate that basic processes involving measurable attributes underlie both verbal and performance effectiveness.

KEVAS is built around a series of psychophysical measures, which are physical responses (i.e. reaction time, auditory memory, etc.) which reflect more sophisticated psychological aspects of functioning.

For example, when we measure hand strength, we also measure manual persistence, or how long an individual will persist after mastering a trying task. We are interested in measuring basic hearing acuity, but are even more interested in auditory memory, and in determining what perceptual mode is preferred by an individual. We believe that particular occupations may be best performed by individuals with specific perceptual preferences: auditory, visual, combined visual/auditory, tactile, or yet other sense-dominance.

KEVAS evolved empirically. An earlier device, the Key Tabletop Lab, included only a reaction-timer, a hand grip measure, and a component for measuring the visual processing-learning mode.

As we undertook research with groups in varied settings (handicapped high school students, dislocated auto workers, Park Ranger and Correction Officer applicants, mechanics, clerical personnel, electronics technicians, disadvantaged youth, vocational rehabilitation clients, and normal adults and youth seeking vocational direction), we added devices to measure auditory acuity, auditory memory, auditory localization, fine motor adeptness and speed, as well as tests of non-language based abstract reasoning ability and of expressed vocational interests. Tests of arithmetic skills, reading ability, functional literacy, and knowledge in specialized areas were also included.

With the advent of the micro-computer, the development of a self-contained test administrator with report producing capabilities became feasible. The development phase extended over three years and the end product is KEVAS, an acronym for Key Education Vocational Assessment System (Figure 1). It is a transportable test station which integrates all of the test devices developed earlier, and which directs the test-taker through a series of varied performance protocols via specialized software. Based on experience with interactive test devices, a primary objective in the development of KEVAS was the achievement of a consistent administration protocol which would

eliminate examiner variation, but at the same time be capable of accommodating to situational variables. KEVAS software allows for administration consistency, while at the same time permits an on-site proctor to respond to subject needs by interrupting, restarting or regenerating a subtest via integrated keyboard access. This keyboard is also used to enter subject demographic and historical information, to review and verify test performance, and to enter data from additional measures for integration into the client database and individual report.

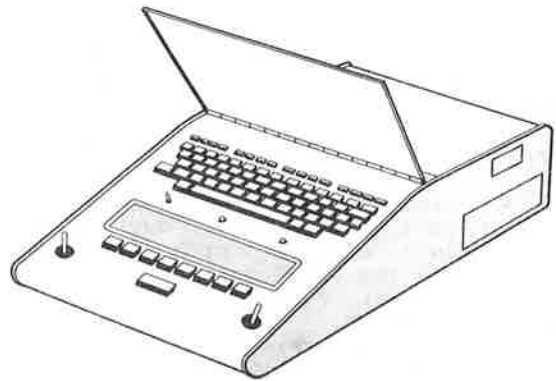


Figure 1. KEVAS (Key Education Vocational Assessment System)

KEVAS hardware was constructed to facilitate subject interaction. A liquid crystal display similar to that found in pocket calculators was selected for use, as it provided a less-threatening visual stimulus than the conventional Cathode Ray Tube, since test anxiety was a factor we wished to minimize. The LCD also offered the practical advantage of displaying larger print.

KEVAS records all subject responses and will printout raw data on request. The device scores individual test performance against a norm, which is preselected by the user, and which is intrinsic to the software. An interpretive graphic profile report is generated on-site.

In writing about computer applications, Matarazzo (1986), states "this new technology offers considerable potential for advancing clinical interpretations of the products of computerized testing". Fowler, (1986) indicates that computer-based test interpretations are accomplished consistently and offer the additional advantage of being able to manage large amounts of data.

In addition to utilizing a consistent interpretive procedure, one of the more unique capabilities which KEVAS

offers is the ability to retain all client data for subsequent analysis. This capacity allows for on-going refinement of norms and a diversity of research applications. The data collected by KEVAS can be uploaded to a larger computer for application of a variety of analytical and data management procedures.

The final phase of KEVAS development is focused toward integrating the vocational matching protocol, which matches the individual performance profile to occupational and/or training requirements. To date, functional criteria have been developed for more than 600 occupations and 75 vocational training programs. The highest expressed interest areas are utilized as the primary sorting variables, and the degree of exactness to be used in the matching process can be adjusted to local needs. This capability allows for a refined fit to be utilized for personnel selection programs, while a more lenient match, may be utilized for placement into training options.

The development of KEVAS reflects the hard years of thinking, effort, and work of numerous professional people, each representing a particular field. Our task is to produce, to the limits of our expertise, a reliable and meaningful assessment which directly relates to the type of work that people do, to their skills, their mode of perception, their persistence, their reasoning and abstracting abilities, and their motor skills. For these are the actions of work.

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