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ABSTRACT

With the development of Career Oasis, King Fahd University of Petroleum and Minerals (KFUPM) has pioneered the use of computer-based career guidance in Saudi Arabia. KFUPM contracted with Verbal Media, LLC, an American consulting company, to create a resource that would be available in both Arabic and English, in both online and paper-and-pencil versions, and that would be adapted to the economy, educational system, and culture of Saudi Arabia. Together, Verbal Media and KFUPM created the assessments, the software, the career information, and the guidance support needed to establish and maintain a useful career development resource. (GCP)

Developing a Career Resource for College Students in Saudi Arabia

by

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Introduction

With the development of Career Oasis, King Fahd University of Petroleum and Minerals has pioneered the use of computer-based career guidance in Saudi Arabia. KFUPM contracted with Verbal Media, LLC, an American consulting company, to create a resource that would be available in both Arabic and English, in both online and paper-and-pencil versions, and that would be adapted to the economy, educational system, and culture of Saudi Arabia. Together Verbal Media and KFUPM created the assessments, the software, the career information, and the guidance support needed to establish and maintain a useful career development resource.

The Need

Saudi Arabia today has a pressing need for resources to help with career development. A huge baby-boom generation is poised to enter the job market just as the economy has cooled down from the days of high oil prices (MacFarquhar, 2001). The government has mandated that an increasing proportion of the jobs currently held by foreigners be filled by citizens, but the opening up of these jobs does not guarantee job satisfaction. Meanwhile Saudi Arabia is moving toward membership in the World Trade Organization and is educating a workforce of world-class engineers, scientists, and business leaders at universities such as the King Fahd University of Petroleum and Minerals (KFUPM). Will the graduates of these universities find satisfying jobs? How will they meet the opportunities and adjust to the career dislocations that come with membership in the global, high-tech economy?

To shed light on the unfolding career development situation in Saudi Arabia, Americans may find it useful to remember their own national experiences in a roughly similar era: the late 1960s and early 1970s. That also was a time when a baby boom was entering the workforce, when the economy was unstable, and when the country was just beginning to feel the effects of membership in a global economy. (Remember what happened to the automobile, steel, and energy industries at that time?) One way in which the United States responded at that time to its own need for help with career development was to invent computer-based career guidance. Therefore it is entirely appropriate that Saudi Arabia is now turning to this same powerful resource to help with its career development needs.

The Impetus

KFUPM, in Dhahran, is an all-male university that specializes in engineering and science — it might be compared to MIT. All classes are taught in English, and before students may enter the four-year curriculum they first must complete an "Orientation Year" in which they improve their English and learn certain academic skills that are typical of American-style college-level classes (such as writing original research papers).

In 1997 Dr. Naim Atiyeh, Director of the Testing and Evaluation Center at KFUPM, began to investigate how computer-based career guidance might be obtained for his university and eventually for the Kingdom as a whole. He did so with the encouragement of Dr. Abdul-Aziz A. Al-Dukhayyil, the Rector of KFUPM, who is a psychologist and had previously supported Dr. Atiyeh in his development of college entrance examinations for use in Saudi Arabia (Atiyeh, 2002).

Dr. Atiyeh approached Dr. Laurence Shatkin, who has been working in the field of computer-based career guidance since 1979 and was one of the developers of the SIGI PLUS system at Educational Testing Service (Norris, Shatkin, & Katz, 1991). In a visit to KFUPM Dr. Shatkin presented the principles and benefits of computer-based career guidance and discussed the requirements for a system that would meet the needs of KFUPM students, taking into account the Saudi economy, educational system, and culture, plus the need to have the interface and content in the Arabic language. Ultimately Dr. Atiyeh decided that the expense of adapting an existing American system would be too high to be feasible, and that a more appropriate and doable strategy would be to create an entirely new tool based on information that is in the public domain, subject to verification through local field research. The projected career guidance tool would be developed in the two targeted languages at once, English and Arabic. KFUPM investigated consulting services in the U.S. and contracted with Dr. Shatkin, from Verbal Media, LLC, a well-known American author in the field of computer-based career guidance. Thus Career Oasis was born.

The Requirements

Dr. Atiyeh formed a Career Guidance Committee at KFUPM to oversee development and use of Career Oasis as a career guidance tool. The following requirements were set for the new resource:

- It must be based on a valid model of career decision making.
- It must cover a wide range of occupations of interest to KFUPM students, including occupations not linked to the degree programs at KFUPM, but excluding occupations for which minimal training is required.
- It must include an assessment, a search in the database, and information about occupations and degree programs available in Saudi Arabia.
- It must be available in both English and Arabic.
- It must be available in both an online version and a paper-and-pencil version.
- It must be appropriate for the culture of Saudi Arabia.
- It must be easy to use.

On the basis of these requirements, a detailed proposal was prepared by Verbal Media for a Career Oasis resource.[1] Five faculty members at KFUPM reviewed the proposal and

contributed suggestions for revision and expansion that subsequently were incorporated into the proposal.

The Model

The proposed resource, Career Oasis, is based on a guidance model that maximizes individual freedom of choice and emphasizes satisfaction of individual values and personal preferences. It recognizes that self-understanding is an important component of career decision making, and that the counterpart to self-understanding is knowledge of career options (occupational and educational). With both of these kinds of knowledge, the choice can be informed and rational. This model is based on the work of Martin R. Katz (Katz, 1966).

The implication of this approach is that Career Oasis includes self-assessments of values, interests, and preferences — linked to a large database of information about occupations and how to prepare for them. The linkage between the two elements is made clear, so that students gain a clearer understanding of how they relate to the world of work and to higher education.

Career Oasis uses self-assessments, rather than tests or other kinds of assessments, because self-assessments are very efficient, students take them seriously, they work especially well on the computer, and they encourage students to be committed (Katz, 1993).

The Database

Career Oasis uses a database derived from the O*NET 1.0 database developed by the U.S. Department of Labor (Peterson et al., 1995). Occupations were eliminated if they had minimal educational or training requirements, or if they were inappropriate for the Saudi culture (e.g., Gaming Cage Workers). Other occupations were added because they were typical of the Saudi economy. The accumulated set of 690 occupations was then handed to a committee designated by the Testing and Evaluation Center at KFUPM for matching with the Saudi occupational taxonomy. This committee included a labor economist and two educationists. The committee also identified which occupations are open to men, which to women, and which to both sexes, and rated the occupations on their level of income (high, medium, or low) and on their level of job opportunity (high, medium, or low).

The occupational descriptors used in the O*NET database were then simplified, in an attempt to reduce the number of skills to be used for rating. It was found that many of the skills and other rated features in the O*NET database were highly intercorrelated — in other words, redundant — so it was possible to collapse several and thus reduce the total number of features that needed to be assessed. For example, the six skills that the O*NET conceptual model called *Content Skills* were reduced to four: Read/Write, Listen/Speak, Mathematics, and Science. Another consideration for selecting skills was to try to use concepts that would be readily understood by students. In some cases skill names used by O*NET were modified or completely changed to be more easily comprehended. The result of this process was that the number of skills was reduced from 46 to 16.

The O*NET database contained another dimension called *Abilities* that included variables that would be difficult for students to distinguish from similarly named skills, even though the dimensions were conceptually different. For example, the ability "Mathematical Reasoning" and the skill "Mathematics" might appear redundant. Therefore,

the abilities chosen for use in Career Oasis (and called "Special Abilities") were those that had no equivalents in the skills domain and were thought to be readily understandable to students as abilities.

For values, a similar procedure was used to separate the 21 O*NET values into the six categories used in the O*NET content model, and then to examine the intercorrelations within categories. For example, in the category called *Achievement* the high correlation (.91) between Ability Utilization and Achievement led to the merger of these two values into one called Achievement. By this method the number of values was reduced from 21 to 15. (Subsequently, as discussed below, three values were added.)

When occupational features (such as specific skills or values) were combined, the ratings assigned to occupations for those features were averaged. For example, when the O*NET values Ability Utilization and Achievement were combined into one value called Achievement, the mean rating for these two values was used as the single rating for the Career Oasis value.

The interest fields used in the O*NET database are based on the six rubrics used by Holland in the Self-Directed Search (Holland, 1976). It is important to note that for Holland, these six rubrics cover the *entire structure* of personality as it relates to occupations. Since Career Oasis was to use interest fields as only one domain of several, it was decided that they should be based on a more narrowly focused domain, the dimension called "Knowledges" in the O*NET content model.

The O*NET content model included a dimension called *Physical Work Conditions* that contained four rated categories: Work Setting, Environmental Conditions, Job Hazards, and Body Positioning. Because many of the specific conditions included here were too highly specific, or not very relevant to the Career Oasis selection of occupations, many of these features were combined and others eliminated. As a result, it was possible to reduce the total number to 14.

For the educational database, the Classification of Instructional Programs of the U.S. Department of Education provided the names and descriptions of college majors. The CIP taxonomy was already crosswalked to the O*NET database of occupations, so that it was known which college majors were considered best preparation for which occupations. Based on this crosswalk, an educational database was assembled, consisting of all those college majors that were linked to the occupations included in Career Oasis. No other college majors were included.

The Ministry of Higher Education provided a listing that showed which majors were offered at each of the Saudi colleges and universities in the higher education system. These majors were matched to equivalent CIP majors, and their titles were translated into Arabic.

Major Components of the Product

Career Oasis is available in two formats: as a workbook with a machine-scannable answer sheet, and as a fully online program. Both formats are available in both English and Arabic. Both formats offer a *self-assessment* of the student's work-related values, interest fields, skills, and special abilities, a *computerized search for occupations* that meet the

student's preferences, and retrieval of *facts about occupations and college majors.* Both formats allow the search results and facts to be printed out, and both provide a folder to help students interpret their printouts, plus a letter to the student's parents.

The Scan-Sheet Version

In the scan-sheet versions, students complete exercises in a workbook, some of which involve writing in the workbook (warm-up exercises), others of which involve writing responses on the scan-sheet (assessments). The scan-sheet is then read by an NCS-10 scanner, and the resulting data file is processed by the Career Oasis Utility program, producing a printout that is returned to the student in the folder.

The Online Version

In the online version, students complete a series of assessment exercises that produce results that are stored for search. The interactivity allows for feedback that is not possible in the scan-sheet version — for example, students are warned if they choose a low-rated value as one of their top values. The assessments cover the same domains as in the scan-sheet version and produce the same results, which are stored in memory rather than on a paper sheet.

The Search

The routines for self-assessment and search in Career Oasis are designed to produce the same results for the scan-sheet and online versions (Shatkin and Norris, 2001). In both versions, the students select an intended level of educational achievement, give weights to all the values, rate their abilities on all the skills and special abilities, and select a limited number of interest fields. In both versions students also identify their "Top Three" values and skills in order to bring greater focus to their choices, and narrow down the features that they will use in the search. In both versions, the search selects occupations by eliminating those that provide a below-average amount of satisfaction for a specified value or interest field, or for which the importance of a specified skill or special ability is below average. For example, specifying the value Responsibility eliminates the occupation Law Clerks, because in that occupation there are not a lot of opportunities to obtain this satisfaction. Specifying the skill Persuading and Negotiating eliminates the occupation Amusement and Recreation Establishment Managers, because that skill is not of high importance in that occupation. In the scan-sheet version, students rank-order the "Top Seven Features" that they want to use in the search, and these features are applied one at a time, stopping short of using a feature that will reduce the list to fewer than three occupations. In the online search, by contrast, students have the ability to add or subtract features at will and can immediately see the effects these actions have on the resulting list of occupations.

In the online version, students can double-click on any occupation on their list to see the facts about it. In the scan-sheet version, the facts are automatically printed for the occupation at the top of the list. (Occupations on the list are ordered by their ability to satisfy what the student asked for.)

The Printout

Essentially the same printout is produced for the scan-sheet version and the online version, and it includes the following: a summary of what the student said about himself (KFUPM is an all-male university) in the self-assessment; the results of a search (in the online version, perhaps several searches); the core facts about an occupation of interest or one that was retrieved by the search (in the online version, perhaps several occupations); and the core facts about a college major of interest (in the online version, perhaps several majors).

The Parent Letter

The printout is accompanied by a parent letter designed to foster discussion between the student and his parents. The developers of Career Oasis are acutely aware that adolescents have two needs that work at cross-purposes: the need for parental input in important decisions versus the growing need for the son to learn how to make decisions independently. Considerable care was taken to ensure that the letter balances the two needs.

Facts About Occupations

In both versions, the occupational reports include the following information: title; Saudi occupation code number; open to males, females, or both males and females; definition; amount of required education; important tasks; special work conditions (e.g., sitting, standing, indoors, outdoors); income level (expressed as high, medium, or low); important satisfactions (i.e., of work-related values); important interest fields; skills and special abilities that are important for the occupation; recommended college majors, together with a definition and the Saudi colleges or universities offering the major. In the online version, about one-third of the occupational reports are accompanied by a photograph of a worker or work site, in almost every case obtained from a Saudi university or agency.

Facts About College Majors

In both versions, reports are generated about college majors showing the definition, the Saudi colleges or universities offering the major, and the occupations to which the major is linked.

The Folder

The Career Oasis folder does more than keep the printouts and parent letter together. It also includes an insert that explains how to interpret the Career Oasis printout, an exercise (printed on the inside) for deciding between occupations of interest, and information (printed on the back cover) about how to conduct additional career exploration.

Research on Work-Related Values

It was understood from the beginning of the development process that one of the major tasks would be deciding on a set of work-related values that would be appropriate to use with Saudi students and for which information was also available or obtainable.

The 14 values that were selected on the basis of data analysis were reviewed by the Career Guidance Committee at KFUPM to ascertain whether this set of values from O*NET

was adequate for Saudi students. The committee first added a value, Conventionality, that is not included in O*NET and is defined as "Not being in situations that break with norms, customs, or traditions."

Next a questionnaire based on this list was developed both in English and Arabic. It was administered to a sample of 94 students drawn from KFUPM High School, the Orientation Year, and upper-classmen. All of the current values, with the exception of Working by Yourself, were considered important.

At a later stage, based on additional comments from the KFUPM committee and suggestions from students, three more values were added: Job Opportunity, Recognition, and Responsibility. The last two of these are included in the O*NET content model, and therefore information was available. (Eventually the occupations in the database were rated on Job Opportunity by the KFUPM database committee.)

As a final test of all 19 values, a Web-based version of the questionnaire that included all 19 values was developed by a KFUPM programmer at the Testing and Evaluation Center and put on the KFUPM Web site. This questionnaire drew 24 responses from high school students, 92 from orientation-year students, and 23 from college students. The results confirmed that all of the values, including the newly added three, were important to students — and that Working by Yourself was the least important.

Development of Assessments

The assessments were designed to cover the same variables that are used to describe the occupations in the database — e.g., the same 19 values. An assessment typically consists of a *definition* of the variable and a *rating scale* by which the student indicates the importance of the variable to him (value) or his level of ability (skill or special ability). For interest fields, there was a definition, but the rating scale was simply yes or no. Definitions were closely based on wording derived from O*NET, but in cases where two or more variables had been combined to form a single variable, wording of the definitions was combined in a way that conveyed the overall concept. Skills were defined with several illustrative examples to help students make self-estimates more realistically.

The Field Test

In November 2000, Dr. Shatkin visited KFUPM to conduct a field test of the English and Arabic scan-sheet version and of the English interactive version in collaboration with the Testing and Evaluation Center at KFUPM. (The Arabic interactive version was not yet complete.) Two samples of students were designated, one using the scan-sheet version, and the other online version. After each session students were given an evaluation questionnaire to fill out. Of the scan-sheet users, 18 returned it. When asked how interesting and how useful Career Oasis was, they rated Career Oasis "good," and 94% of them said they would recommend it to a friend. Users of the online version completed a slightly different evaluation questionnaire, with 25 responding. Their opinions about the interest and usefulness of Career Oasis were identical to those of the first group, and 88% said they would recommend Career Oasis to a friend. In both groups, students thought the amount of time Career Oasis required and its reading level were "just right." Observations of students during use of Career Oasis and interviews afterward revealed several ways that the workbook and online program could be made easier to use.

Arabization of Career Oasis

The Testing and Evaluation Center at KFUPM took charge of the adaptation to Arabic. A committee was formed to prepare the first draft of the translation, which covered all paper-and-pencil materials, as well as the online screens. Two psychologists were then selected for final review and revision (Drs. Atiyeh and Ibrahim of KFUPM). Creating the Arabic version of the online program also required reprogramming, which was undertaken in collaboration with the technical support staff of the College of Computer Science and Engineering at KFUPM (Mr. Al-Muhtaseb).

The Initial Releases

Release 0.9 of Career Oasis, with both scan-sheet and online versions in English, was produced in April of 2001. It included an administrative program that enables the guidance counselor to retrieve a count of how many students have used Career Oasis between any two dates. Two other releases were tried out to address certain special requirements of Arabic script, before an improved user-friendly release (1.2), free from bugs, with full consistency between the outputs of the Arabic and English versions, was put in place in April 2002. It functions on PCs running an Arabic-enabled version of Windows (2000 or more recent).

Training Counselors for Support

Guided by the understanding that the process of career guidance would be more effective when accompanied by human counseling (Rozman and Kahl, 1984), the Testing and Evaluation Center of KFUPM organized a series of meetings and workshops to provide training at KFUPM in the use of the Career Oasis program for group and individual counseling. Dr. Shatkin was invited to lead this effort for two weeks, from April 4 to April 17, 2002. He gave a series of workshops in collaboration with the Testing and Evaluation Center and the Information Technology Center, addressed to faculty advisers and staff from the various colleges of the university and from KFUPM High School. The workshops were designed to familiarize the trainees with what Career Oasis can and cannot do, to explain how Career Oasis fits into a larger career development intervention with preparatory and follow-up steps, and to provide practice with interpreting the printouts based on sound counseling principles.

Conclusion: *What's Next*

The Career Guidance Committee at the Testing and Evaluation Center has recommended to the Rector several major goals for Career Oasis: to conduct ongoing studies of its validity; to make the program self-supporting; to expand usage; and to create an infrastructure for researching and updating the occupational and educational information. The present plan is for Career Oasis to be used initially by Orientation-Year students, and for usage to be extended later to upper-division students and to high school students. Much remains to be learned about how students of different ages may use Career Oasis differently, how Career Oasis may affect students' choice of academic major or career plans, and how parents may react to increased career development activity at the university.

Notes:

[1] In writing the proposal, and in the subsequent research and development work, Dr. Shatkin collaborated with Lila Norris, who had worked with him at ETS in the development of SIGI PLUS and has been an innovator in the field of computer-based career guidance since its earliest days in the 1960s.

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