# **General Information Website of Employment and Career**

-Research and Development of Career Matrix

The Japan Institute for Labour Policy and Training developed a new system providing employment and career information via the Internet, which has been publicly available as of September 2006. Since its publication, the system has been featured on many newspapers, and introduced on career sites, websites of placement centers and career resource centers in universities with banners linked to it, resulting in more access volume than expected. This chapter explains the development history and functions of Career Matrix.

# 1. Background and Objectives of **Development**

#### A. Background and history of development

Throughout of the shifts in its names from National Institute of Vocational Research, National Institute of Employment and Vocational Research, Japan Institute of Labour, and then to its current name, the Japan Institute for Labour Policy and Training is responsible for collection, organization, and provision of career information which are among the important responsibilities taken over from the Ministry of Labour. Among them are revision of the Ministry of Health, Labour and Welfare Occupational Classification, authoring of Occupation Handbook, development of CD-ROM editions thereof and OHBY: Occupation Handbook for Youth, as well as the research in the current status of and demand for the occupational information and in the trends in the fields related thereto overseas.

In 2000, the Institute was entrusted development of a new system by MHLW and commenced the development of the comprehensive Internet site dedicated to the provision of information on occupation and career. The Institute later expanded the study into a full-scale research and development as one of the comprehensive research projects by the Institute in 2003.

#### **B.** Demands for system

### i. Demand for universal terminology and standard

The standardization of the information on occupation has not necessarily been progressed. For example, Hello Works (Public Employment Security Offices), private staffing agencies, job opening classifieds, manpower supply companies and other related organizations are currently employing their own original occupational classifications better befit to their respective businesses. No uniform occupational classification has been enforced, or no terminology in the skills, knowledge, and work environment has been standardized in job/human resource descriptions.

Furthermore, the job opening information offered by the employers remains merely general description regarding the jobs and work conditions. The foregoing is attributable to the lack of organized terminology to describe the qualities of the actual personnel for a specific position. Meanwhile, experience, occupational ability, aptitudes described in a uniform terminology is not available for individuals seeking employments as a result of the absence of such terminology. In some cases, detailed descriptions approximately the previous experience and current ability upon career changes can be observed, where such uniform terminology for the descriptions is also unavailable.

There also exists requirement of uniformed standards as well as the uniformed terminology explained in the foregoing. This requirement is accrued from the demand for an articulated skill level required in the event where a certain skill is required at a specific level.

# ii. Possibility and necessity of various searches

Conventional information on occupations mostly

comprises description of duties. This is due mainly because the occupational classifications are systematized pursuant to the occupational subdivision based upon occupational analyses. More detailed subdivision and more differentiation between occupational positions are the emphases of the method of this kind. These emphases cancel out some perceptions toward the positions as to the extent of similarities among those positions and their respective situations in the context of other positions.

On the other hand, the new information service system utilizing information technology can render those positions as structures comprised of various qualities which in turn can be used in searches and in clarifying the relationship of the position with others. By utilizing the information on the various qualities of a position, individuals seeking employments can perceive possible existence of occupational positions which initially appear to be totally different from the respective previous positions of the individuals, and where the individuals can apply their respective skills and aptitudes.

# iii. Necessity for prompt information collection

Occupational information has been collected by job analyses conventionally. However, overwhelming volume of personnel and costs required by the conventional method makes it a challenge to continually implement the collection by means of this method. Today's society with drastic changes in various aspects has made the job analyses increasingly insufficient to cover shifts in occupations.

Today's society, as such, gave rise to the demand for development of alternative methods to supersede the job analyses and therefore, the demand for deliberate upon methods with inexpensive and prompt information collection. To address these demands, a method to directly collect information on a specific position from individuals at the position was developed in this project. The method is explained in details later in this article. One of the objectives of this development is to equip the system with this function to directly collect information.

# iv. Optimal placement of human resources and intelligence infrastructure of the IT era

In the same sense as infrastructural development is the foundation of economical and social development, the progress and upgrading of industrial society requires, as a prerequisite, intelligence infrastructure making optimal placement of human resources available. In addition, full stride of the ability each individual has been required in supporting advanced industrial society, which also makes it necessary to establish information provision oriented toward the improvement of the ability.

Already on the Internet are various employment sites offered by public/private organizations, due to the advancement of information technology in the society as well as the governmental policy promoting governmental functions in electronic forms. The Ministry of Health, Labour, and Welfare has already commenced its information services including Hello Work Internet Service, Shigoto Joho Net (Job Information Network), and is considered to further expand its services in the future by establishing sites concerning skill development, sites regarding job creation and continuing employment of aged and disabled and other employment sites. A supersystem to provide uniform glossary of terminology and common standards, as well as to mutually connect organically related subsystems is required in order for the websites to be systematically and mutually linked and to generate synergistic effects. The informatization of corporate human resources and personnel management has recently shown significant progress. There is also required a system acting as informational intermediary in order to link those information systems of corporate human resources and personnel management to related websites on the Internet.

To mutually link these various websites is one of the vital functions of the system developed in the project.

# 2. Research and Development of Career **Matrix**

#### A. Occupational information development

# i. Previous occupational information development

The Institute has authored and published various occupational commentaries and illustrated reference books including Occupation Handbooks (first to fourth editions) for years. These mainly descriptive references with pictures and illustrations were all published as printed materials only. Among those references for use on personal computers are CD-ROM of the Occupation Handbook Fourth Edition developed in 1997 and CD-ROM edition of OHBY: Occupation Handbook for Youth developed as an information source of occupations for junior high school/ high school students in 2002. With these developed references, occupational information has been transformed from printed references to databases for use on personal computers, and such contents different from descriptive references as pictures, movies and even function for users to conduct self-diagnosis have been included in the CD-ROMs in the course of their updating.

Information service has been made available via the Internet by Career Matrix. Thanks to Career Matrix, the latest occupational information has become accessible at no cost by anyone, anytime, anywhere. As for the information provider, Career Matrix has made it available to provide a massive volume of the latest information for more recipients at affordable costs. As mentioned earlier in this article, the Internet has been utilized not only in provision but also collection of information, thereby brought innovative change in development of occupational information.

### ii. Selection of occupations to be included

In consideration to its vital role to give information utilized in job seeking and recruiting activity as well as to give career guidance, the selection criteria for the occupations to be included first prioritizes those with more number of employees, those with more intensified increase of employees, and those with more numbers of job openings posted at Hello Works. And then the selection was made among those with common qualifications and/or licenses, those with more representativeness in occupation classifications, those attracting more applicants or popularity, those being the standards of aptitudes or job characteristics, and others.

The more occupation it encompasses, the more useful it may be, and the more the costs for development and maintenance will be. Also, attempt to augment occupation to be covered means facing difficulties incurred from the absence of any society or group related to the occupations of prospective inclusion, or the sparse employees therein. Consideration to the foregoing, the numerical target of the occupations to be included in Career Matrix was set to approximately 500 occupations. The target number of occupations to be included would cover approximately 90 % of all the employees nationwide based upon the estimation derived from the number of employees in the minor groups of Population Census.

#### iii. Collection of occupational information

The primary method for the information collection is to visit and survey societies and groups related to a specific occupation. The Institute is visiting the societies and groups to collect the information and to commission to compile occupational commentaries. The Institute visited approximately 600 societies and groups prior to the publication of Career Matrix. The Institute may visit companies or offices about which referrals were made to the Institute by the societies and/or groups. The Institute is recording essential duties and works of the occupation on pictures to be offered in Career Matrix. Upon photo sessions with model businesses, the Institute communicates with a business selected for a certain occupation, visits the business, takes pictures allowing time required, and selects the best shot among the pictures taken. In addition, the Institute is constantly correcting various statistics and related data on occupations and industries.

# B. Development and implementation of "jobs survey system on the web"

As a new attempt in the project, collection of occupational information by the Web monitors (i.e. consumer monitors for survey) has been introduced in the development of Career Matrix. Occupational information prior to the new attempt had been collected by individuals trained for the "Job Analysis" visiting workplaces and other locations to observe the ongoing duties and to have a hearing with parties concerned for the collection. However, this conventional method is becoming more incapable of getting on a par with the fast changes in occupations and society, because of difficulties in costs and personnel, as well as the time required for it.

On the other hand, the number of service monitors of the research companies using the Internet has grown up to significant numbers due to the widespread Internet and there are some research companies with more than one million web monitors. This prospect seeks to utilize the web monitor to directly collect information on a specific position from individuals at the position. The survey was conducted over four years using the Web monitors of three research companies. The survey first inquires regarding the monitor's occupation followed by the web Occupational Analysis System in the event the occupation falls in one of the occupations subjected to Career Matrix. A total of approximately 1.9 million web monitors were subjected to the survey over the period. Detailed occupational information was collected from the web monitors with occupations subjected to Career Matrix after identifying the occupation of those 1.9 million web monitors.

The Web Occupational Analysis System first provide a task list prepared for each occupation to select tasks the web monitor is engaged on his/her position. Should there be any task which is not in the list; the web monitor can describe the task in a box provided for the description. Then the web monitor will proceed to evaluation of the skills (35 items) and knowledge (33 items) in five grades from "necessary" to "not necessary at all," followed by evaluation of the interests (six items) and work styles (six items) preferred on the occupation, and further proceed to

the evaluation of work environment (14 items) of the occupation also in five grades. Total evaluation items amount to 94.

Various statistical assessments were conducted for the data thereby collected to exclude questionable data, and then organized as the figures to be the standards of the respective occupations. The world of occupations is excellently rendered by numbers despite the fact that the further statistical assessments are currently performed as the collected data is available for various assessments from different points of view.

#### C. Link to the other related systems

The development of link with Hello Work Internet Service which allows to browse employment information of Hello Work has already been completed. Related information of Hello Work Internet Service is now accessible from the occupational information pages. If, for example one is interested in the occupation of the "Computer Programmers" and seeking to have it as his/her occupation after referring to Career Matrix, then he/ she can browse actual employment opportunity information of the occupation by clicking a button on the occupation page of the "Computer Programmers." The development has been completed as mentioned earlier, and no problem is identified on its operation. However, the further inspection must be yet to be performed for any possible defects under various conditions before making it publicly available.

More and more websites related to vocational trainings and skill development is developed by other organizations on the Internet today. Currently, evaluation and developments are under way at the Institute to make links to these websites available. Once the links are made available, the locations where one can participate in the education and training programs required for the occupation he/she found in Career Matrix will be available just a click away.

# D. Usability evaluation and monitoring —trial and adjustment of the system—

In consideration to its public nature, the development of Career Matrix has to assume access by users of various backgrounds (e.g. age, gender, educational levels, etc.) in the society. To better address the assumed users, the Institute designed the system for the comfortable use of any such users by means of numbers of evaluations of usability and monitoring for the identification of problems from different points of view to implement minute examinations and improvements.

Tests by users for the evaluation of usability are conducted three times per annum in the course of development. The test seeks to identify problems by letting the subjects use Career Matrix and observing the subjects. Subjects encompass various individuals including students, professionals, women, men, youth, middle-aged, and elderly.

Multiple usability specialists are asked to objectively evaluate the possibly problematic points by using the system from the specialist's point of view in the specialists' evaluation of its usability. The specialists' evaluation of its usability has been conducted annually in the course of development.

As for the research monitor survey, career professionals in charge of labor exchange or career guidance at Hello Work, career counselors at high schools and universities, industrial counselors are commissioned to use Career Matrix for the collection of evaluation and opinions. General public, including individuals seeking employment, students, youth with no occupations, and freeters (young part-time workers) are also asked to try Career Matrix for the collection of evaluation and opinions.

# 3. Functions and Components of Career **Matrix**

# A. Key pages and their contents of the system

This chapter specifically explains the functions of Career Matrix. The explanation is laid out following the actual steps to use Career Matrix, by starting off from the top page of the entire system, followed by occupation search, and then proceeding to suitable occupation search navigation, career analysis, and ending up with occupational information page.

#### i. Top page of the system (online portal)

Figure 9-1 shows the top page of the system. In the center of the page are the central functions of the system including "occupation search," "suitable occupation search navigation," and "career analysis navigation." On the left of the page is "Occupation Spotlight" which introduces one occupation a week as well as "Theme of the week" which introduces occupations related to a theme specified for the week. Numbers of various related websites are introduced below those weekly contents, thereby making it an online portal as the general information site for career guidance, guidance for employment or career change, career development, employment or vacant position and other subjects. On the right of the page is "Topics" introducing issues of today in guidance for employment or career change. Below the Topics is the Occupation Page View Ranking which introduces occupations with the most page views for a particular week. Further down below is "Notices" where information related to the operation of the Career Matrix is posted located above the section where operation manuals and brochures of the system can be downloaded.

#### ii. Occupation search

"Occupation Search" provides various search methods for an occupation search. "Keyword Search" allows users to search occupations by words contained in the names and descriptive references, whereas "Category Search" allows them to search occupations by classifications employed in the Occupation Handbook as revised to its fourth edition after first publication in 1981 by the Institute. "Search by Theme (objectives)" allows users to search occupations by 52 thematic descriptions such as "Processing things," "Designing," "Taking care of people," and "Work overseas" which constitute the characteristics of occupations. A listing of occupations related to a theme will appear as users specify the theme. "Theme of the week" on the top page introduces one of those themes every week. Themes under the heading "Search by Theme" are sorted into four groups, namely Themes Related to

# Figure 9-1 Top Page of Career Matrix



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Objects (i.e. themes oriented to objects as is known and represented by "T" of "DPT (Data, People, and Things)" located at the top of the section, Themes Related to Concepts or Ideas (i.e. themes oriented to information as is known and represented by "D" of "DPT,") located below the Themes Related to Objects, Themes Related to People (i.e. themes oriented to people as is known and represented by "P" of "DPT,") and Other Themes. Occupation Search also includes search by initial letters of the occupations and search by the Classification of Occupation for Employment Security Service (ESCO).

#### iii. Suitable occupation search navigation

The Suitable Occupation Search Navigation is mainly for students and youth. This function allows users to explore their prospective occupations befit to their results of occupational interest test, focus in their occupation selection or "working styles," their skills and other information. Answering to questions of a brief self-diagnosis test gives users the results appearing on the page based on which they can be furnished with ideas of occupations befitting to their respective selves.

#### iv. Career analysis navigation

Career Analyses Navigation is a system for the individuals with work experience. Users can enter their own respective previous occupations and duties to get resulting statements of the analysis such as "If you have previous experience of the occupations and duties entered, then you have strengths in...(appealing points,) and therefore you are suitable for occupations including..." Also made available is the advanced edition of the Career Analysis Navigation featuring calibration of the skill levels and knowledge levels automatically calculated based upon the entered background to evaluate possibility of a specific occupation for career change or finding employment, and to clearly specify appealing points and challenging points. The appealing point represents the strength or advantage of the individual as is the case of the basic edition, whereas the challenging point represents insufficiency to be fulfilled or improved in order to be on the specified occupation.

Challenge points is planned to be linked to information on methods to improve and to related educational and training institutions, as well as to information on the actual training courses and seminars.

#### v. Occupational information page

Occupational Information which will be provided as the result of using the systems comprises of "Occupation Description" which gives the overview of the occupation with pictures, "How can I make it my occupation?" presenting the approach to the occupation, "Work Condition Characteristics" presenting information including the number of employees and their working hours/average wage of the occupation, "Occupation Profile" which is digitized characteristics of the occupation, and "References" introducing similar positions, websites of related organizations and the link to "Job Job World" providing graphic information of the occupation.

# B. Provision of numerical values of characteristics and uniform terminology/ standards

The "uniform terminology" and the "uniform standards" for job seeking, job offer and skill development were also developed along with the system. Provision of the "uniform terminology" and the "uniform standards" means provision of common occupation names, common classifications, common terminologies in the related fields, and common standards, the absence or ambiguities of which had been responsible for various mismatches and other issues in the course of job seeking process, including discrepancies between the characteristics of backgrounds, skills, and interests of the job seekers and those required by the recruiting employers accrued in collating both.

Total 94 categories comprised of 35 categories of skills, 33 categories of knowledge, six categories of interests, six categories of working style, and 14 categories of work environment are defined and standard value for each category are entered in the system. Ninety-four numerical values (as columns) prepared for each of approximately 500 occupations

(as lines) amount to 5,000 numerical values prepared in the form of a matrix.

The standard numerical values of 94 categories were collected by the aforementioned "Jobs Survey System on the Web," and are the values derived by arranging the grading of individuals with the occupation. The numerical values are also presented as the "Occupation Profile" of Occupational Information, and are used to identify the connections between the characteristics of an individual and specific occupations in the "Suitable Occupation Search Navigation." Furthermore, the numerical values are the standards for analyzing backgrounds in the "Career Analysis Navigation."

# 4. Publication and Operation of the System

Since its publication in September 2007, Career Matrix has been providing information services 24 hours a day, 365 days a year, without any service interruption. This chapter explains the systems, operational structure, and page view etc. trend of Career Matrix.

#### A. Consistent information provision

Since its publication, Career Matrix has been providing exactly the same information on three websites listed below. Those three sites constitute so called "mirror site" relationships. Mirror site is a method used for sharing loads and constant information provision. Those three sites are situated at locations geographically detached from each other, that is to say, one located at the university of the Institute in Asaka City (Saitama), another one located at the research center of the Institute in Nerima Ward (Tokyo), the other one is located at a data center in an undisclosed location within the Special Wards of Tokyo. The data center with multiple security measures can be considered to be totally prepared for disasters and hackers, at the cost of convenience in doing research and development such as information update, system replacement, changing server setup. To address the issue, two out of three sites are situated within the server rooms of the Institute. while the other one is situated in a data center. Hacking, defacement, or attack which was concerned at the time of publication has not taken place up to now for the system being without any confidential information or personal information. Those three sites have multiple servers respectively in order to ensure the redundancy required for sharing loads and stability. Thanks to the multiple servers, information service of the sites has no effects whatsoever even if one of the servers is stopped for maintenance. Due to the information provided from three sites comprised of multiple servers, the information provision of the system as a whole has not been interrupted since its publication. The unavailability of the system must not take place in consideration to the occasions where the service is used, including inquiry into job description upon job seeking or career change, and use in the class at schools. The service must be readily available whenever it is called for.

http://cmx.vrsys.net http://cmx.hrsys.net http://cma.vrsys.net

# **B.** Operation structure

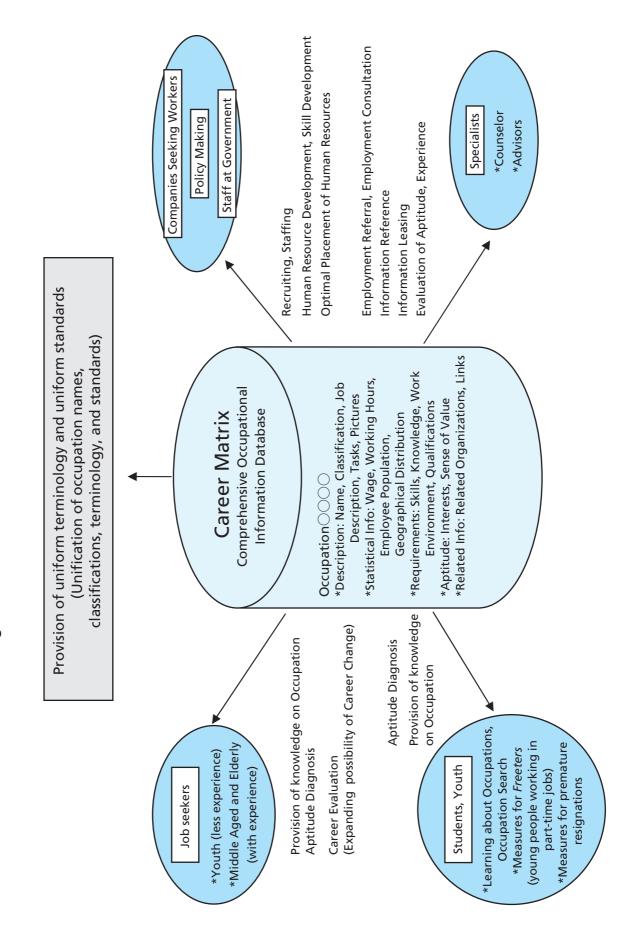
As for the personnel aspect of the system operation, approximately four individuals from the Institute employees or other sources respond to inquiries into the contents of the system around the clock, and also four individuals from the system development company personnel address technical issues. The number of inquiries regarding defects of the system or operation procedures has been less than expected since its publication. Most of the inquiries pertain to license, such as media organization seeking a license to cover the system, or to introduce the system in magazines or websites.

Collaborative software has been introduced to share information on inquiries and answers among the multiple individuals responding to inquiries both at two locations of the Institute and the system development company. The personnel in charge of inquiry are simultaneously handling other tasks including updating/adding the information contents and revision and development of the system.

#### C. Page view status

The number of page views of those three sites amounted to 2.8 million in September 2006 where the

Figure 9-2 Functions and roles of Career Matrix



site was published, and then has remained around 1.4 to 1.8 million per month thereafter. There were days where the number surged to several hundred thousands due to the exposures on newspapers and other media when it was published. However, the recent number of page views per day is approximately 50 thousands to 80 thousands on weekdays and around 30 thousands on weekends and holidays. The period from around 10:00 a.m. to 5:00 p.m. has more number of page views per day, and the number peaks off at 2:00 p.m. The number decreases at 7:00 p.m. then recovers to a fair number of page views until midnight. The number decreases thereafter to the lowest around 4:00 a.m.

# 5. Future System Development and **Expansion**

With enormous number of page views, Career Matrix has become a standard website of its kind. However, merely a part of the entire system has been developed. Development is still under way with its expansion and evolution scheduled in the future. The system for the experts is among those developed in the ongoing concrete development plan. The system released in September is for general public and is readily accessible by students, youth, and individuals seeking career change, and other people in general. There is a demand for a system customized for career experts including career counselors at school, personnel at Hello Works who support career guidance, career change or finding employment. The customized system provides technical information required in career counseling or career guidance. The development of the customized system is now under way with the tentative product name of "Career Matrix Pro." A system to support recruiting activity of companies, and a system to facilitate staffing, making changes in the staff, and skill developments

within companies are also currently being developed. These new systems utilize the database that the existing system has, and that digitizes the characteristics of occupations to support human resources personnel of companies. The human resource development aspect and human resource management aspect of the new systems can be of great use for policy makers and persons in charge of administration of employment stabilization

Figure 9-2 shows functions and roles of Career Matrix organized in a conceptual diagram. Career Matrix has set a goal not only to be an information system which supports individuals seeking employment in finding jobs and career change, and which is an information source of career guidance for students and youth, but also to be an information system used by companies seeking workers and career experts. On the other hand, the most fundamental function and role of Career Matrix can be defined as the provision of uniform terminology and uniform standards comprised of common occupation names, common classifications, common terminologies, and common standards. Therefore, the objective of Career Matrix is to disseminate the uniform terminology and uniform standards of the relevant fields by means of making Career Matrix widely used.

#### Reference:

Japan Institute of Labour. 2003. Jinzai no saiteki haichi no tameno aratana shokugyo no kihon joho shisutemu ni kansuru kenkyu- Kigyo/kojin nizu chosa, shogaikoku no shisutemu, hon-yakujikkenban no kaihatsu,etc.- [Research on a new occupational information network designed to place the right person in the right job-Survey on the needs of corporations and individuals]. Chosa Kenkyu Hokokusho (Research Report), no.151.

The report in Japanese is written by an author below: (As of March, 2007) Shinsaku Matsumoto, Senior Researcher, JILPT