SPeK PSM - Competency Assessment System for Malaysian Public Sector Information System Officers

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One of the challenges faced by IT professionals is to keep abreast with current technologies that are evolving continuously. It is a pressing requirement that IT personnel particularly in the public agencies, to update their knowledge in order to improve their skills and upgrade their competencies. This requirement is given emphasis in the Ninth Malaysia Plan. As public agencies are urged to shoulder the responsibility in ascertaining their IT professional remain competent, these authors studied the requirement of developing a system that could help public agencies in taking this endeavor. The motivation to develop such a system was identified from a survey carried out among public agencies in Putrajaya, the center for public administration for Malaysia and also as the result of Competency Assessment Level examination monitored by the Public Services Department of Malaysia. The method employed for deriving the IS skills set is by using the Modified Delphi Technique with a panel of 18 IT experts. In this paper we would like to share the experience on setting up a web-based system that could assist IT personnel to self assess their competencies.

1. Introduction

Modern organizations are increasingly faced with challenges that did not exist 20 years ago. Globalization, distributed work environments, and increased competition have all complicated the process (1). Malaysia as a developing country also faced the same challenges especially ensuring the public services at its best performance. To meet these new challenges and to remain relevant in a rapidly changing environment, our leaders realize that the public service must continuously pursue reform efforts that will help in enhancing the knowledge and skills of the employees and the efficiency and effectiveness of the organizations (2).

The government has introduced the Malaysian Remuneration System (MRS) in 2002 to replace the New Remuneration System, which was introduced earlier in 1991. The main elements in the MRS (2) are:

i. The introduction of a new approach in the assessment of competency level and performance appraisal of employees in the public service that emphasizes knowledge acquisition, skills development and a positive work culture.
ii. The introduction of motivational element in the remuneration system for employees to acquire knowledge and enhance competency

This paper will focus on the competency of the Malaysian public sector information officers who manage the information technology matters of government agencies such as the ministries and departments. A proposed system namely SPeK PSM will help discover the officers’ competency gap. Hence appropriate training for professional development can be identified to rectify the situation. Organization can be strengthened and proactive with knowledgeable and skillful workforce or k-workers.

2. Information system officer

Under the MRS, all government personnel are divided into 4 service groups; the top management group, management and professional group, support group I and support group II. The information system officer comes under the management and professional group which comprises of grade F41, F44, F48, F52, and F54. The code “F” and “FT” is for information system service classification. Besides the information system officer, there are information system assistant officer, computer technician, and data processing machine operator which fall under support group I and II while JUSA or highest administration post in public sector agency is under the top management group.

Responsibilities of the information system officer include; investigating the appropriateness of existing agency’s computer system, continuously develop, analyze, design, implement, maintain and reviewing the data and information processing to suit the agency’s needs (3). As of 31st December 2005, there are 1,451 information system officers nation wide (4).

3. The existing competency identification system

Competency Identification System (CIS) has been used by all public agencies since 2004. It has six skill components being assessed; functional, technical, behavior, information communication technology (ICT), language,
and generic. The competency items differ according to service classifications and grades. It is derived from many face-to-face workshops conducted by appointed consultants and members of each service classifications. Self-assessment is annually done and the final mark will be transferred to the central human resource management system, HRMIS.

There are six levels of competency scale being used; entry, foundation, competent, proficient, expert, and strategy expert. When performing self-assessment, staffs are required to use the above scale for each competency item. Each personnel can access directly the outcome of the assessment process. For each competency item there are indicators with different colors shown beside the item. The indicators can show whether the individual competency score is higher than the expected score or the expected score is higher than the individual score or both having the same score. Beside individual report, the agency’s IT director and managers could also view the agency or unit/branch or subordinate competency result.

CIS for IT personnel lacks in-depth competency items especially the technical component and the branch/unit IT managers do not have the privilege to evaluate their subordinates’ competency. These limitations are being considered in the proposed system.

4. The proposed system - SPeK PSM

Sistem Penilaian Kompetensi Pegawai Sistem Maklumat in Malay language (SPeK PSM) or Information Officers Competency Assessment Systems was developed as a tool to evaluate the IS skills level among IT officers in Malaysia’s public sector organizations. The following subsections describe the system design approach opted for deriving the skills set, system’s specifications and functions, and future enhancements for SPeK PSM.

4.1 System design approach

We have categorized the IT focus area into 11 different classes and each has its own skills totaling to 117 items as follows (5):

i. IT Strategy and planning (14 skills)
ii. Project Management (15 skills)
iii. Business Architecture/Functional Analysis/Business Process reengineering (11 skills)
iv. IT Technical Architecture (9 skills)
v. Systems Development – Application and Web-Based (17 skills)
vi. System Management – Server Administration, Web Administration and Technical Support (11 skills)
vii. Network Management (9 skills)
viii. Database Management (8 skills)
ix. Information Security and Disaster Recovery (11 skills)
x. Contract Management and Procurement (7 skills)
xi. Systems Deployment and Maintenance (5 skills)

The skills set are derived from a five rounds Modified Delphi Technique which took 16 months to complete. The methodology was defined as Modified Delphi Technique because the design of content for the Delphi technique instrument did not begin with an open-ended or unstructured question where Subject Matter Experts are required to identify and generate items. The Delphi technique uses the consensus method to determine the extent of an agreement over a particular issue being deliberated (6). A panel of experts was asked to identify, clarify, refine, and finally gain consensus on a particular issue over a series of rounds. An advantage of this technique was that the panel does not meet. Therefore, opinions could be expressed without influence from others (6), (7), (8), (9). The selected experts remained anonymous to one another throughout the exercise with only group ratings reported.

The questionnaires were adopted from a study done in 2001 by Malaysian Administrative Modernization and Management Planning Unit (MAMPU) (10) and the items were updated with new technologies and regulations being implemented since then. A pilot test was run prior to round 1 by distributing the questionnaires to an IT officer and 2 ex-IT officers who become IT lecturers. For the purpose of establishing content validity of the questionnaire, the number of experts is more than 10 because this number is consistent with Daley’s finding (as cited in (11)) that the reliability and average group error is a function of panel size. Daley found that reliability is maximized and average group error is minimized if Delphi panels had at least 10 members. The selection of individuals to serve on the panel of experts was made through peer survey and not through random selection of a population. The success of the Delphi Technique depends on informed opinions; therefore, it is important that individuals be identified through a nomination process and not random selection (12), (13). The panel consists of seven women and 11 men. They are 11 IT officers from various government agencies which represent each grade from the “F” scheme, five IT lecturers from the local universities and two non-“F” scheme government officers whom involves greatly in IT sectors.

The first three rounds establish a competency matrix of the required competencies for each grade of the IT officer. The panels rank each competency item according to the scale from 1 (not required) to 5 (highly required). After completing the competency matrix the other two rounds were conducted to identify the competency scale of the required competency item according to IS officer’s grade/level. The panel rank each required item according to the scale from 1 (conceptual – least proficient), 2 (experienced), 3 (expert) and 4 (guru – most proficient). The median was used because it is a measure of central tendency that summarizes a list of opinions and discounts extremely high or low estimates. The median value of each required competency item is then used in SPeK PSM.
4.2 System specifications and functions

SPeK PSM is a web-based assessment system, which was developed using ASP.NET and the database was developed using MySQL Server 4.1. Table 1 summarizes the software used for the development of the system. SPeK PSM requires only the standard home PC hardware configuration connected to the internet.

Table 1: Software requirements for SPeK PSM

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<tr>
<th>Software</th>
<th>Usage</th>
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<td>Development environment requirements</td>
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<td>ASP.NET</td>
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Figure 1 below shows the importance of enhancing the competency of each information officer in order to strengthen the branch/unit and its capability in IT. This is more important and critical when most of the government’s agencies are involved in public services where secure, efficient and effective services are given priority.

Fig. 1. Formation of agency IT competency

The users of the system can be divided in the following manner:

i. The IT director of an agency
ii. The IT manager of each agency’s IT unit/branch
iii. The IT officer under each agency’s IT unit/branch
iv. The system administrator located in one of the government’s agency preferably the Public Services Department of Malaysia

The modules that are available for each category of users are as depicted in Figure 2.

In SPeK PSM’s first module, the system administrator registers and updates all agencies IT department and assigns user name to each agency’s IT director. Updating of the IT focus areas and competency items is also done here, strictly under the approval of a selected committee. The committee can view and get reports of registered agencies’ IT competency or can access any IT officer’s competency results.

In the second module, each agency’s IT director registers and updates all agency’s IT branch/unit information and assigns user name to each branch/unit IT manager. He/She can select focus areas and competency items for each IT branch/unit manager’s competency evaluation purposes. He/She can also query and view each IT branch/unit’s competency, IT officers’ competency, and his/her own competency against Delphi’s benchmark. The IT director can also update his/her personal information.

The IT manager module gives control to the agency’s IT branch/unit manager to assign user name to each IT officers in the branch/unit. He/She may update any new or retired IT staff. Like the IT director, the IT manager can also select IT focus areas and competency items for supervisees’ competency evaluation. He/She can also query and view his/her IT branch/unit’s competency and IT officers’ competency. He/She can view his/her own personal competency against Delphi’s benchmark and the IT director’s evaluation (if any). The IT manager can also update his/her personal information.

The last module is where all registered IT officers in a branch/unit of an agency can assess their own competency according to what focus areas and competency items that their manager had selected. If their manager has not completed the selection process, they can evaluate themselves according to the current focus areas and competency items involved in their daily work life. They can choose to compare the result against their manager’s assessment and Delphi’s benchmark. All IT staffs are recommended to update their personal information.

Figure 3 shows the homepage of SPeK PSM where
system administrator and IT officers have to key-in their user name and password in order to access individual main menu according to user group. Figure 4 shows a screen shot from the IT manager module where the selection of IT focus areas for his/her subordinates took place. SPeK PSM is still under construction with the assessment and reporting function currently being programmed and tested.

4.3 Future enhancements

The current version of SPeK PSM can be further enhanced in order to fully maximize its usefulness. Features that can be greatly improved upon is the security from virus attack by developing the system using open source software for example running on Linux operating systems, using PHP programming language, and MySQL database. Adding English version to SPeK PSM is another enhancement as many IT skills references are in English. Next feature is the formation of special interest groups (SIG). This will enable IT professionals to interact more with other IT professionals with the same interest. This will indirectly contribute towards improving the level of their IT skills. Another useful feature that can be added on is online competency tutorials and tests to help information officers from grade F41 and F44 in their Competency Assessment Levels examination which was introduced since 2003. Lastly, the competency assessment system should be incorporated in the main system used in the government’s human resource management system i.e. HRMIS for the purpose of achieving data accuracy, systems efficiency and management effectiveness.

5. Conclusion

In this paper we have presented a web-based system that can be used as a tool to evaluate the skills level of Malaysian public sector IT officers. The ideas that accompanied the project can be fully exploited in order for organizations to compete better in the global economy. However, an authoritative body, such as the Public Services Department of Malaysia in general and Malaysian National Computing Council (MNCC) specifically should champion this cause so that there exist a standard of IT skills level equivalent to those set up by the UK and the USA. Once this standard has been set up, we should try to seek accreditation from professional bodies like the Association of Computing Machinery (ACM) so that Malaysian IT officers and professionals are recognized world wide.

References

(10) MAMPU: Report on study for the government of Malaysia on manpower requirements to support the application and diffusion of IT in the Malaysian public sector (2001).