Abstract:
This paper aims to evaluate the managerial competencies of the academic staff member through using testing and DSS tool for the members to determine the training needs of them, by applying the study on the academic staff member of Faculty of Dentistry, Alex, University, by testing them in the managerial competencies. The tests were evaluated by using DSS tool and the needed training plan are determined for each one. The paper surveyed the literature review of the competency concept, competency management and Decision Support System (DSS) concept and brief history. The conclusion and future research points are mentioned also.

Keywords: Competency, Competency based-assessment, Competency Based Management (CBM) Training needs, Managerial Competencies, Decision Support System (DSS).

1. Introduction

Competency-based management has become a very crucial element in the effective operation of any enterprise or any business organization, due to the increased need of the latter to be agile enough to adapt to quick market changes and re-orientation of its business plans. In this situation, competency based management (CBM) would be the core human resource tool, which would enable the enterprise to manage and develop the skills of their employees, recruit the most appropriate candidates, and make effective succession planning and employee development plans. Apart from enterprise competency management systems nowadays research is being conducted focusing on the development of CBM system for academics, which may provide possibilities such as the easy integration and mapping of different competencies required to perform various tasks associated to academicians. The quality in higher education has become a necessary condition for the knowledge transfer, knowledge creation and knowledge services to the society. There are many experts who suggested development of certain skill sets in a faculty that in turn helps in the development of technology and globalization to meet the ever changing needs of society. (Pooja, at...el, 2010)

Various research works related to the changes in educational and organizational perspective related to Competency Management (CM) are summarized in the following section. (Centra and John, 1993) studied a reflective evaluation processes for the organization. (Sanchez and Heene, 1979) invented competence management as a strategic management. (Spencer and Spencer, 1992) analyzed Competency as a link to the human performance model. (Chou and Tsai, 2004) explained the importance of organizational knowledge for creating activities is more than the individual knowledge. (Lidgren, 2002) developed range of competence systems and studied the


Keenam (2005) projected a DSS to match the skills of the prospective employees with the needs of the employer. Huang (2004) explored a DSS in Human Resource selection which utilizes the fuzzy neural network in evaluating the managerial talent. Berio (2004) presented a case study for modeling and managing the competence of an enterprise. Vartarien (2003) studied the competencies in virtual organization that can be used at work and also for the lifelong learning. Stenmark (2003) analyzed the need of rethinking of competence management systems for the knowledge of based organizations. Colucci (2003) described an approach to ontology based semantic match of skills descriptions. Ranjan and Tripathi (2007) developed a theoretical framework for measuring competencies in academic institutions. Ranjan and Tripathi (2008) presented an Empirical Study for the competence Management. The review of the literature reveals that though there is lot of research and reforms taking place in educational environment focusing on the changing role of faculty and the realization of the CBM approaches in the various business organizations. But there is not a single model presented which can incorporate the CBM in the educational environment to meet the changing requirements of the educational institutions. The review of the literature also reveals that though there is lot of research and reforms taking place regarding the changing role of faculty in academics and the implementation of CBM approaches in various business organizations, but not a single model is available, which can be easily incorporated and implemented in educational institutions. Also, Information Technology (IT) has become the important component for the success of any business organization. In today’s fast changing business environment the role of
IT is changing a lot. Its use has not been restricted to record keeping, processing transactions or viewing the reports and analysis of data but the role has been extended to take decisions and to build strategies for enhancing the business usage from Management Information System (MIS) to the Decision Support System (DSS). The DSS helped the managers to extract the critical information from their huge data in the way they want (Turbain, 1995). With today’s dynamic and highly competitive environment, the organizations tend to lose their competitiveness/business, if their employees don't keep pace with the emerging technologies. The transformation from production economy to knowledge economy has provided both the opportunities and challenges. This scenario is true in underdeveloped and developing countries. The organizations require manpower with different set of values and competencies which should be productive, creative, responsive and adaptable to fast changing business environment (Stenmark, 2005). So, it becomes impetus to understand the knowledge in the Human Resource (HR) data. So in our paper we will depend on the Decision Support System (DSS) tool to evaluate the competencies.

Decision support systems are gaining an increased popularity in various domains, including business, engineering, the military, and medicine. They are especially valuable in situations in which the amount of available information is prohibitive for the intuition of an unaided human decision maker and in which precision and optimality are of importance. Decision support systems can aid human cognitive deficiencies by integrating various sources of information, providing intelligent access to relevant knowledge, and aiding the process of structuring decisions. They can also support choice among well-defined alternatives and build on formal approaches, such as the methods of engineering, economics, operations research, statistics, and decision theory. They can also employ artificial intelligence methods to address heuristically problems that are intractable by formal techniques. Proper application of decision-making tools increases productivity, efficiency, and effectiveness and gives many businesses a comparative advantage over their competitors, allowing them to make optimal choices for technological processes and their parameters, planning business operations, logistics, or investments (Druzdzel et al, 2002).

**Role of decision making in CBM:**

In any innovative business organization, the Competency Based Management (CBM) has become a very crucial element for effective operation. The CBM helps organization by adapting to quick market changes and rebuilding their strategies and business plans. The CBM has become one of the vital HR tool for managing and developing the skills of employees, recruiting the most appropriate candidate, making effective succession planning and developing the Employee Relationship Management (ERM). CBM involves lots of decision making. By developing Decision Support System (DSS) for CBM, we couple the intellectual resources of human expert along the powers of emerging technologies to improve the decisions making. Decision makers basically utilize knowledge for taking the decisions. Any Knowledge based DSS not only provides solutions of the unstructured problems quickly but also provides an improved way of communication for the employee satisfaction (Turbain, 1995). CBM is one of the areas which require the domain expert to develop various theories through their acquired knowledge from training,
reading and years of experience. These days Artificial Intelligence (AI) tools are applied to the knowledge based DSS. Hence, an Expert System (ES) can be applied to the CBM. It has shown quite promising results to many problem areas such as information systems, information science, business strategies and organization science (Jackson, 2000). Its unique characteristics to simulate human reasoning over the representation of human knowledge and coming to solutions/advice through heuristics methods has attracted the lot of attention for the research work. As the business environment is uncertain and the unpredictable the organizations are turning to AI and ES to develop a knowledge management systems that can provide the basis for future sustainability and competence. Young (1999) discusses about the use of neural network in the Financial Management System (FMS). Tingly (1999) proposes AI to insurance organizations to offer multiple channels for the rapid response for the customers. There are many such knowledge management implementations using AI and ES that rely upon the mean making and sense making capabilities of AI and ES technologies and humans using them. We feel that institutes like any other organization have their own challenge developing an effective way for managing competence can enable an institute to build stronger links between stake holders while providing timely input into the decision making process. Academic institutes all over the world follow the common pattern to measure the competencies of their employees. The basic human resource component in educational institute is faculties, supporting staffs, team heads, and training and development staffs. They also have a well defined competence metrics in terms of their jobs and their requirements. They too have the competency assessments tools which are applied periodically to assess their competencies. For their existence in the competitive environment there should be customer orientation and the plan for continuous improvements and up gradations (Ranjan et al,2008).

**Theoretical Framework:**

A competency may be described as a combination of skill, attitudes and behavior that an individual or an organization is competent at, that is, the ability to deliver; perform (a set of tasks with relative ease and with a high level of predictability in terms of quality and timeliness), (Spencer, 1993). Competencies are important, as they help to communicate what an individual stands for or what the expectation is (Ernest, 1989). The proper and careful use of competencies is important as it will help increase clarity in the system, bring transparency and build trust by avoiding multiple interpretations of the competence concept, both by the employees and the organizations. McClelland (1973) defined competence measurement as a tool for distinguishing superior performer from average performer. Ernest (1989) presented the competence as a statement which describes the integrated demonstration of a cluster of related skills and attitudes that are observable and measurable necessary to perform a job independently at prescribed proficiency level. King and Kenneth (1997) described the competency as an overt and measurable performance in terms of quality, quantity, time, cost or a combination of any of these, for which action or performance oriented verbs are to be used in writing competency statements. Dranganidis and Mentazas (2007) Identified competency as a combination of the tacit and explicit knowledge, behavior, and skills that give somebody the potential for effectiveness in task
performance. After reviewing most of the definitions presented by different authors, we found that these definitions mainly suit to the requirements of business organizations. However, in attempts done by (Pooja at al, 2010) present a definition which is more suited to academic environment. Taking this view competency has been defined as the combination of attributes such as personality, ability, knowledge and skills (PAKS) that help the institution in the process of knowledge transfer, knowledge creation and the knowledge services to the society. The available literature on CBM for academia shows that still lots of work need to be done on CBM based approach for academic institutions which is highly essential in this era of knowledge.

**Concept of "DSS":**

According to Keen Dan Scoot Morton: “Decision Support System is a merger of the source - the source of intelligence with the ability of individual components to improve the quality of decisions. Decision Support System is also a computer-based information systems for management decision-making that deal with the problem - the problem of semi structure” (Mutia, 2010).

The definitions provided during the last 30 years for DSS show, according to (Keen, 1987), “both what DSS is and what it is not”, with consequences on both the scientific basis, and the credibility of the decision support applications. Essentially, a DSS is a computerized system which improves the activity of decision-makers situated on different levels in the chain of command (from supervision of different processes to leading positions in politics). At the same time, DSS stimulates the decision-maker to improve the decisional process and make the right decisions in order to obtain high and quickly visible performances (decision effectiveness) (Filip and Bărbat, 1999). As early as 1980, (Sprague, 1980) observed that the initial definition of the Decision Support Systems – computerized interactive systems which support decision-makers in using data and models to solve unstructured problems was too restrictive, and thus, the definition was expanded to include any system involved in the decision-making process. This expansion of the definition made the concept of Decision Support Systems an umbrella term for different types of systems, many of which having no connection with the initial idea of Decision Support Systems (Alter, 2002). If, initially, Decision Support Systems were instruments for large companies, today, they also address small companies too. These instruments have changed and will change considerably the way in which decisions are made. They enable the individual or organizational decision-maker to manage more effectively the volume and complexity of information and better co-ordinate activities.

Decision support systems are interactive, computer-based systems that aid users in judgment and choice activities. They provide data storage and retrieval but enhance the traditional information access and retrieval functions with support for model building and model-based reasoning. They support framing, modeling, and problem solving. Typical application areas of DSSs are management and planning in business, health care, the military, and any area in which management will encounter complex decision situations. Decision support systems are typically used for strategic and tactical decisions faced by upper-level management decisions with a reasonably low frequency and high potential consequences in which the time taken for thinking through and modeling the problem pays off generously in the long run.

There are three fundamental components of DSSs. Database management system (DBMS) serves as a data bank for the DSS. It stores large quantities of data that are relevant to the class of problems for which the DSS
has been designed and provides logical data structures (as opposed to the physical data structures) with which the users interact. A DBMS separates the users from the physical aspects of the database structure and processing. It should also be capable of informing the user of the types of data that are available and how to gain access to them.

Model-base management system (MBMS) is analogous to that of a DBMS. Its primary function is providing independence between specific models that are used in a DSS from the applications that use them. The purpose of an MBMS is to transform data from the DBMS into information that is useful in decision making. Since many problems that the user of a DSS will cope with may be unstructured, the MBMS should also be capable of assisting the user in model building.

Dialog generation and management system (DGMS). The main product of an interaction with a DSS is insight. As their users are often managers who are not computer-trained, DSSs need to be equipped with intuitive and easy-to-use interfaces. These interfaces aid in model building (Druzdzel et al, 2002)

DSS characteristics and functions

The characteristics specific to a DSS depend on the type of decision the systems have been designed for (Bellorini and Lombardi, 1998). However, numerous authors have suggested a series of “standard” characteristics any DSS should possess. Considering the results obtained by (Parker and Al-Utabi, 1986) after studying 350 sources on the same subject (Bellorini and Lombardi, 1998) and the essential characteristics emphasized by (Filip, 2004) we may synthesize a list of DSS characteristics:

• To provide support and improve, not replace, human reasoning; the user maintains control over the DSS at all times.
• To assist managers in the decision-making process connected with unstructured and semi-structured problems, which cannot be solved through simple reasoning and judgment, or through any other classes of information systems;
• To be flexible and adaptable in relation to the changes in the context of the decision and support as many (or even all) decision process stages as possible;
• To be focused on characteristics in order to make it more user-friendly to less proficient users (managers on all levels, a single decision-maker or a group) and not be limited to the computerization of some methods of working used before the implementation of the system, but to facilitate and stimulate new approaches (to ensure support for a variety of decision processes and for different styles);
• To combine the use of analytical models and techniques with data access functions; the data and information in the system should be obtained from various sources;
• To improve the efficiency of the decision process, rather than its effectiveness, focusing on the increase in productivity and the quality, suitability and applicability of decisions, rather than on the time and cost of decision.

In conclusion, the main characteristics of a DSS are:

• It alleviates efforts, amplifies decision-makers’ capacity and its purpose is not to replace them or transform them into mere agents who adopt mechanically solutions provided by the computer;
• Its purpose is to approach semi-structured problems, in which sections of the analysis effort could be computerized, but the decision-makers use their own reasoning to control the decision process.
DSS classification

The systems that used to provide support in the decision process have been named by specialists Decision Support Systems or Decision Management Systems. Recently, terms such as artificial intelligence, data mining, on-line analytical processing, and knowledge management have been used for systems whose objective was to inform and assist managers in the decision process (Muntean, 2003).

Because of the existence of a huge number of terms, which have caused many problems to DSS research, several criteria, have been proposed for a classification of Decision Support Systems (Suduc, 2007). Undoubtedly, numerous DSS classifications have been developed in time, but we shall restrict below to those classifications which are enough relevant and encompassing to the subject in discussion. Donovan and Madnick (1977), quoted by Turban (1998), divided DSS, according to the nature of the decisional problem, into two categories:

- Institutional DSSs facilitate solving structured problems within an organization;
- Ad-hoc DSSs facilitate solving semi-structured problems, which are not usually anticipated.

Hackathorn and Keen (1981), quoted by Turban (1998), identified three categories of DSS:

- Single-user DSSs;
- Group DSSs;
- Organizational DSSs.

Steven Alter, quoted by Muntean (2003) proposed in 1980 a classification of the Decision Support Systems according to “the degree to which the system's output can directly determine the decision”, independently from problem type, functional area or decisional perspective. Thus, seven categories of Decision Support Systems were proposed, divided into two super-classes:

- Data-oriented DSSs
  - File Drawer Systems, whose purpose is to automate certain manual processes and provide access to data items. They address people who have operational responsibilities (operators, clerks, workshop supervisors). Currently, this category includes simple query and reporting instruments which access transactional systems;
  - Data Analysis Systems, which facilitate the analysis of current and historical data, in order to produce reports for managers. Data analysis is required for budget analysis, business opportunities analysis, investment effectiveness analysis, etc.

Today, this category includes a large number of data warehouse applications;

- Analysis Information Systems, which provide access to a multitude of support databases for the decisional process, as well as a series of simple models in order to supply information necessary for solving particular decisional situations.
- Model-oriented DSSs
  - Systems oriented on Accounting and Financial Models. The models employed are “what-if” and “goal-seeking” and they are frequently used in producing profitability estimates for new products, estimative balances, etc.
  - Systems oriented on Representational Models, which use simulation models to estimate consequences; they are used extensively in risk analysis, in production simulation etc.;
• Systems oriented on Optimization Models which help producing optimal solutions for different activities;
• Systems oriented on Suggestion Models, which carry out the logical process that leads to a suggested decision for activities with a certain degree of structuring (such as determining the rate of updating insurance, models for the optimization of bond supply, etc.).

Advantages and limitations

Filip (2007) identifies four advantages and six limitations, as shown below:

Advantages

• Direct (or intermediated) work with the decision support system may contribute to improving the individual’s decisional capacity;
• Increase in work productivity by extending capacity of decision-makers to directly process information;
• Expanding decision-makers’ individual capacities leads to improved decisions, as a result of a better analysis;
• being an artificial object, the decision support system is objective and impartial;

limitations

• The system lacks human traits: creativity, intuition, imagination, irresponsibleness or the instinct of self-preservation;
• Because of hardware and software limitations, there could be consequences which lead to insufficient qualities (regarding correctness and completeness) of knowledge accumulated within the system and in the limited possibilities of communication between decision-maker and the DSS;
• In order to be effective and efficient, the system must be designed with a specific purpose in mind, for a specific field of use and a specific type of relative decision problems;
• The DSS is designed as a component part of the global computer system of the organization, from which it derives the necessary data. Thus, there may be compatibility problems between computer systems;
• Terminological issues and problems related to the significance of certain aspects approached by DSS may arise because of the cultural differences between developers and users;

Managerial Competency:

To achieve an effective performance, a corporation requires a certain managerial competence. According to some researchers, managerial competence can be measured by various aspects, which, by Cockerill et al. (1995) is identified as high performance managerial competencies (HPMC). HPMC will be one of the primary capitals to achieve organizational competitive advantage. To obtain an effective performance, company needs people who have a suitable competency. The fact is that paradigm
shift from old to new paradigm, now management is focused on more humanistic aspect. Managers should give more attention and motivation to their employees. Accordingly, managers are required to have a good interpersonal skill. Refers to Daft (2003), there are two main things of a managerial competency i.e. leadership and team building skill. Leadership aspect is characterized by delegation of authority, while team building skill should be possessed by front liners who directly relate to the customer. According to many researchers, the measures of managerial competency can be determined by many aspects. Cockerill et al (1995) presents eleven aspects of managerial competency that mention as high performance managerial competencies / HPMC. Those eleven aspects are information search, concept formation, conceptual flexibility, interpersonal search, managing interaction, developmental orientation, impact, self-confidence, presentation, proactive orientation, and achievement orientation. Beside Cockerill with high performance managerial competencies, Abraham et al. (2001) presents ten aspects of managerial competency as a result of their research which is at the first formulation there are more than twenty aspects of managerial competency. The ten aspects are stated as good oral / written communication skill, problem solver, results oriented, interpersonal skill, leadership skill, customer focus, flexible / adaptable, team worker, dependable, and quality focus. Those are having a high descriptor (80%) in the research. According to Abraham et al., the ten aspects of managerial competencies should be possessed by managers at each level of management in the organization. Therefore, this research uses those ten aspects as a measure of managerial competency.

**Competency –based assessment Method:**

**Competency –based assessments** are constructs that provide a means to define and measure job skill ability and performance. Competency based training assessment was introduced to Australia in the early 1990s through the push to restructure Australian industry and the national training Reform Agenda (Robin, 2000).

A variety of other concepts are also associated with competency based assessment of individuals: motives, traits, self concepts, attitudes, cognitive behavior skills, work habits, etc. (shipman et al, 2000).There is also debate among HR practitioners and academicians regarding whether the term competency refers to behavioral output or an individual's characteristics and qualities (Mcvagan,1997). In reference to developing expertise in a given discipline. The concept of competence can be dated back to Persian (in the code of Hamurabbi), Greek (in Lydia of Plato) and Roman times (in general language), has been used in Europe from the sixteenth century and entered professional literature in law (competence of courts and witnesses), public administration (competence of institutions), organizational structure (competence of departments or functions), management (core competence, competence management), and education and training(competence-based education) from the seventies of the last century (Mulder, 2007).
(1959) wrote a piece in which he defined competence as a basic motive for the acquisition of knowledge, mastery of skills, need for exploration, or competence as exploratory learning for “efficience”. McClelland (1973) stated more than a decade later that traditional testing needed to be changed, as the prognostic validity of IQ testing and of traditional assessments in education, training and selection of professionals was limited. Gilbert (1978) made a link between competence and effective performance improvement. Boyatzis (1982) did large-scale studies on competence of managers, asking top performing managers to define their new competence concept, task-oriented; and meaningful in a specific context and at a sufficient level of specification. Apart from relevance, there are more notions behind the new concept of competence. Based on various theories of education and empirical research, eight principles of comprehensive competence-based (vocational) education were developed for the empowerment of local education teams to facilitate interactive processes of curriculum deliberation (Wesselink et al., 2007a, b). These principles were included in a matrix that was meant to be an instrument for program teams. Applying these principles will result in a comprehensive approach of competence-based education. And the more recent competence-based developments (Biemans et al., 2004; Mulder et al., 2006; Weigel et al., 2007). The most fundamental criticism regarding competence-based education comes for higher education, especially from the liberal education tradition. Hyland (2006) for instance, sees competence-based education as a form of reductionist behaviorism. It is not clear whether he refers to the older conceptualizations of the concept or to the newer more holistic ones, which stress the broad development of the full potential of students. Anyway, it is good to review the perceptions of higher education faculty, in particular full university professors, also in the natural sciences, to see whether the criticism against competence-based higher education indeed is as strong as some critics suggest. Together with that, it is good to have a picture of the opinions of other stakeholders in higher education, especially university.

2. Research methodology and design:

The study was done by applying competency tests. It was carried out with the participation of the academic staff of the Dentistry-Alex-University. There are ten departments within the faculty, the department of Removable Prosthodontics, the department of Conservative Dentistry, the department of Oral Pathology, the department of Oral Maxillo Facial Surgery, the department of Oral Biology, the department of Oral Medicine, Periodontology, Diagnosis and Radiology, the department of Orthodontics, the department of Pediatric Dentistry Public Health, the department of Dental Bio Materials, the department of Maxillo Facial and Plastic Surgery. 115 academic staff works in these departments. However most of the academic staff did not want to be included in the study because of the work load. In this way, the study was only carried out with the participation of 80 academic staff members.
Research Model:

Figure (1) shows the research model

Step (1): Determining the academic staff administrative competencies

Step (2): Competency Testing

Step (3): Test evaluation

Step (4): Determining the training needs decision

Figure (1) Competencies assessment model

Step (1): Determining the academic staff management and administrative competencies: according to previous study done by (Harria et al., 2007) about the academic competencies for medical faculty, they determined that the administrative competencies will focus on: managerial, communication, decision making and problem solving….etc. So in our paper the focus will be on such competencies because of the importance of that role for academics.

Step (2): Competency testing, through giving them tests in verbal critical thinking, time management, managerial skills, communication and presentation skills, negotiation skills and personality test.

Step (3): Test evaluation, through using excel spreadsheets as DSS tool and data entry for the academic staff test scores.
Step(4): Determining the training needs decision for every member, after entering the scores and calculate the result the Decision Support System (DSS) will give us the final decision about the needed training for every member.

Figure (2): Individual test report
Figure(3): Assessment report for the population
3. Research Results:

Figure (4): the training needs for each competency

Figure (4) shows the academic staff member need training in the following competencies as follows:

- Abstract reasoning with 58 trainees
- Verbal critical reasoning with 67 trainees
- Time management and work pressure with 57 trainees
- Communication and presentation with 71 trainees
- Negotiation skills with 71 trainees
- Personal skills with 66 trainees

Findings and conclusions:

<table>
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<tr>
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<th>Hours</th>
<th>Number</th>
</tr>
</thead>
<tbody>
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<td>Decision making and problem solving</td>
<td>L3</td>
<td>24</td>
<td>58</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Effective presentation skills</td>
<td>I1</td>
<td>24</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Effective communication skills</td>
<td>I2</td>
<td>24</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Negotiation skills</td>
<td>I3</td>
<td>12</td>
<td>71</td>
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<tr>
<td></td>
<td>People management</td>
<td>I4</td>
<td>24</td>
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<tr>
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In our paper, we have discussed the managerial competencies needed for the academic staff member and we assessed them by using DSS tool to set training plan to develop their competencies, and the Dss tool was more effective way than the traditional way. So the training plan set according to the test score of each staff member.

For future research we suggest after the implementation of the training plan that the evaluation must be done through use an effective decision support system(DSS) and not use the traditional way. that tool can applied on the other types of academic competencies such as : teaching and research competencies

Reference


