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INFORMATION SKILLS: PERSPECTIVES AND ALTERNATIVES IN SEARCH STRATEGIES

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ABSTRACT

This article points out the ability of information technology to generate, process and disseminate information, which expands faster than our capability to access, receive, filter, accept, integrate, manage and use information. As a result we are faced with information overload. On the other hand, in performing daily work routines, only relevant information is needed. To acquire the needed information, having skills in strategizing information searches is one of the criteria of an information literate person. The benefits obtained from innovative processes involving use of information are extensive. This article elaborates on how human resource managers can reap the benefits from the extensive use of information. Another aspect discussed in relation to information skills is language. Language command appears to be an important factor determining the precision of the information being searched. This is also because the relevance of the information that is being sought depends on the linguistic aspect, terms and concepts that are being used in indexing and searching. Information search is an activity that is performed to acquire relevant document. The success of searching relevant document depends on many factors. This article provides some basic techniques that can be used by means of term associations and also as a way to manage some of the problems involving language use. Hence, one can ensure that information searches conducted can be more effective and relevant. The author has developed a model to analyse information literacy concept and its relationship with research implementation process, which stresses on several elements of aspects of teaching specific information skills. Emphasis is given on integrating cognitive elements, thinking skills and strategies in the information research process.

Keywords: Information skills; Information literacy programmes; Search strategies; Precision and recall; Language command; Thinking skills.

INTRODUCTION

With the increasing use of computers, information overload is becoming commonplace. The abundance of computer reports, coupled with all other forms of communications is making it virtually impossible for receivers to decode all available information. As a result, receivers selectively choose to interpret the messages they deem most important. This selective attention causes decisions to be made on partial data. In an era where we depend on information and recognize it as basis for economic growth, information is needed as a source of empowerment for various sorts of technology. Information as a product of economy has sometimes been found to be more important than commodities, energy and services. The ability of information technology to generate, process and disseminate information expands faster than our capability to access, receive, filter, accept, integrate, manage and use information. As a result we are faced with information overload. Information overload happens when too much information makes it impossible to attend to all the information received. On the other hand, in performing daily work routines, only relevant information is needed. To acquire the needed information, having skills in strategizing information searches is one of the criteria of an information literate person.

USE OF INFORMATION AMONG MANAGERS

Researchers have found that, in Malaysia and many developing countries, managers in public and private organizations have not had the formal information skills training even though they know the type of information needed (Abell 1995, Juhana 2000). In business organizations and enterprises, information may be categorized into two: internal and external. External information is gathered from outside the organization into the organization while internal information is generated by the organization whether as a part of the organization's operations or procedures, or as a result of the gathering and analysis of data that are unique or specific to the organization.

The flow of information occurs in three ways: from the environment into the organization/company (external information), from the organization into the environment (company's information) and surrounding the company (internal information). The two most important uses of information in the organizations is to make decisions, and to find solutions to problems and to generate ideas that are creative and innovative. In making decisions, two components are involved (Ryan

1988): information and thinking (management judgement). For example, a newly discovered technology in the company (which can be considered as internal information being generated) with the knowledge on the market for product that was produced from the new technology (considered as external information) can be used to support decision to invest in the new technology.

Ideas develop from information. The integration or synthesis between two or more segments of information by managers with a creative mind can spark off new innovative ideas. The lack of innovative ideas can be one of the reasons organisations fail to adapt to changes, to make improvements or to progress. If innovation is being ignored, actions that are drastic in nature are not being thought or thoroughly researched well (such as in starting a mega project), and this will result in great loss or disaster. The benefits obtained from innovative processes involving use of information are extensive. Below is an example of how Human Resource (HR) Managers can reap the benefits from the extensive use of information.

Problem: Employee discipline problem
Identification of specific discipline problem: Data can be gathered from internal sources such as from staffs' personal record, minutes of meetings, discipline board records, etc.

Search Strategy: After having identified the problems, managers use information skills strategy involving the use of controlled vocabulary. Thus for discipline problems such as listed below, the controlled vocabulary are given as such:-

Stealing/theft/ dishonesty	Alcohol/Drug Abuse
Safety rule violation	Sexual harrassment
Absenteeism	Insubordination
Tardiness	

Managers locate information from various sources by using the Online Public Access Catalogue, CD-ROM in relevant areas such as Proquest (for business and management information), Psyche Abstract, online databases and powerful meta-search engines such as Complete Planet and Copernic. However, enough effort should be made to the search strategies that involves use of controlled vocabularies, thesaurus so that all possible related terms are used in searching for the appropriate information.

Thinking skills: Managers may want to look for articles which explain how companies handle or should handle these employee problems,;what course of action should the manager follow; analyse the differences and similarities of the cases reported in both academic journals and the practitioner journals; and integrate critical and lateral thinking skills in every research process.

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An example of the information or search results that could be retrieved from a online search made from EBSCO online database, and therefore may improve decisions to be made by the human resource manager, specifically to solve problems in relation to employee absenteeism, is presented below:

Result of the search made from EBCSO online database

Database name : Academic Search Elite

The link information below provides a persistent link to the article you've requested.

Record: 4	
Title:	Many ways to reduce absenteeism, cut costs.
Source:	Worklife Report; 1997, Vol. 10 Issue 3, p14, 2p
Subject(s):	EMPLOYEES -- Attitudes ABSENTEEISM (Labor)
Abstract:	Discusses issues pertaining to employee absenteeism. Difficulty of differentiating voluntary from involuntary absenteeism; Strategies used to lure employees to work; Contributing factors; Assumptions of employers regarding absenteeism.

Record: 6	
Title:	Big Employer Is Watching.
Author(s):	Maher, Kris
Source:	Wall Street Journal - Eastern Edition; 11/4/2003, Vol. 242 Issue 89, pB1, 2p, 2 cartoons
Abstract:	Reports that more companies are electronically monitoring the movements of their employees in an effort to improve productivity and efficiency. Comments from Derek T. Smith, a managing partner at a law firm that requires employees to check in at a secretary's desk by placing a finger on a sensor; Other examples of companies monitoring employee attendance electronically; Comments from Lewis Maltby, president of National Workrights Institute, a workplace-rights advocacy group, regarding the tracking systems; View of Pam Dixon, an author and privacy-rights expert, regarding the unintended effect of falling productivity with a tracking system in the workplace.

THE IMPORTANCE OF LANGUAGE IN INFORMATION SEARCHING

Information needs of managers differ according to task, functions and purpose for needing the particular type of information. The information needs of corporate planning certainly differ from a HR manager. While corporate planning managers need market research, other company's profile, the HR managers need information on aspects relating to labour relations, strategic human resource management, compensation and salary administration, labour arbitration, managing problematic employee, etc.

Other important factor in this context is the use of language. Language command appears to be an important factor determining the precision of the information that is being searched. This is also because the relevance of the information that is being sought depends on the linguistic aspect, terms and concepts that are being used in indexing and searching. Before further discussion, it is felt necessary to explain that information search is an activity that is performed to acquire the relevant text or document. The success of searching relevant document depends on many factors. Even though information systems has assist us in conducting search with ease and has improved the method for searching and better information flow processes from source to target audience, in the actual fact, the basic problem in information search has not changed much. What has changed and improved is the hardware and software, and facilities from mechanical and technical aspect not the intellectual aspect.

The intellectual problem is more difficult because it involves experience, creativity and one's ability to search and more importantly to master the language. If the concept of 'recall' is defined as relevant text that was successfully located or traced, the concept of 'precision' would mean the text that was searched is found to be accurate and relevant to the information needed.

Basic techniques in information search

Some of the problems listed above is illustrated in Table 1, to further clarify the types of information skills that could be acquired. The table provides some basic techniques that can be used by means of term associations and also as a way to manage some of the problems involving language use. Hence, one can ensure that information searches conducted can be more effective and relevant.

Table 1: Basic search techniques in databases where controlled vocabulary is used.

CONCEPT	DEFINITION	EXAMPLE OF TECHNIQUES RECOMMENDED
Controlled vocabulary searching (CVS)	CVS involves searching for descriptors (e.g, subject headings, author's name) that an indexer has selected from a standardised list such as Library of Congress Subject Heading (LCSH).	To search for books on "case studies in personnel management", the appropriate approach to use is: Personnel management – case studies. (as found in LCSH)
Keyword searching	Keyword Searching involves searching for words that have been automatically indexed by a computer.	To search for a Book titled: "The Human Relations of Organizations", one may use all the words in the title except 'the ' as the search term.
Boolean Logic	The use of Boolean operators (AND, OR, NOT) for more precise searching of databases (or symbols +/-).	See example below
AND	The use of Boolean operator "AND" enables the database to search for records that include for all of the terms (Narrows the search)	"Legal and regulatory environment" AND "human resource management" "Compensation" AND "salary administration"
OR	The use of Boolean Operator "OR" enables the database to search for records that include any of the terms (broadens the search)	"labour relations" OR " arbitration" 'union' or ' collective bargaining'
NOT	The use of Boolean Operator "NOT" delete records that include this term (narrows the search)	Adult NOT children The search result will not include "children"
Truncation	Substituting "wild card" characters for one or more letters	Recruit*. The search will include the following words:Recruit, Recruitment, recruited and recruits
Limiting	Information can be searched more specifically by restricting research results to a subset of the database	Search can be limited by: Language, date, location, format and research done on human
Nesting	Clustering groups of terms that belong together within parentheses in order to ensure execution of the search statement	(social or welfare) AND human resource
Proximity	Requiring words to appear within a certain distance of each other	Asian* near2 American*
Adjacency	Requiring words to appear immediately adjacent to each other	Job adj description

It is clear that language has a strong influence in determining the rate of precision and recall of information. In this context, the effort to find relevant information is not easy to achieve. Take for an example, a HR manager who wants information on compensation and salary administration in private companies If he searched using the term "compensation", the results recalled something on compensation but not precisely within the context of private companies. As we can see, from the search on compensation solely, an article on compensation system in higher educational institutions may be retrieved as illustrated below.

Title:	Operational Advantages and Disadvantages of the Faculty Compensation Systems**.**
Source:	ASHE-ERIC Higher Education Report; 2001, Vol. 28 Issue 2, p33, 21p
Subject(s):	EDUCATION, Higher COLLEGE teachers -- Salaries, etc.
Geographic Term(s):	UNITED States
Abstract:	Explores the operational advantages and disadvantages of the faculty compensation systems in higher education in the U.S. Operational reasons to support a merit faculty compensation system; Impact of merit system on individual faculty behavior; Rationale of fairness or equity of single salary systems; Salary administration with merit compensation.
Persistent Link to this Article:	http://search.epnet.com/direct.asp?an=10296113&db=afh

Electronic information systems introduced in late 1970s has enabled the search for information to be more flexible, i.e. users are able to use single terms, keywords, and natural language and combine terms using Boolean operators as illustrated in the search strategy below:

Legal + "regulatory environment" + personnel or "human resource management"

However, perfect matching is seldom achieved. This problem occurs because information involves research that encompasses various disciplines. Regardless of whatever the discipline is, the point that should be given attention in the effort to achieve perfect matching is term association. The use of computer and information technology has enabled us to search and match the term association fast. It really depends on an individual's effort to identify the appropriate terms and subject and make intelligent adjustments and changes from time to time based on the feedback one obtained from the information system itself. Only by doing so we can expect that the information system can support term association and provide as much relevant information as possible.

Another aspect to consider is in order to find more information from any information system, we need to expand the scope of our search by adding other related terms. However, the more we expand the scope of our search, the more irrelevant information may be retrieved. Thus, even though information retrieval today depends more on the use of computers, it is important that one have good searching and language skills as well. These two skills cannot be replaced with menus, graphical user interfaces and help assistance on the computer screen. Such skills need to be acquired through practice, exposure and experience, enhanced with interest and need. The interdependence among the three components of the information systems interaction process, namely system, text and user, is continuous. From the perspectives of the user, attention given to the retrieval mechanism is appropriate based on our ability and skills in searching for suitable information. If we are not satisfied with the result of our initial search, we should change our search strategies by either using new terms or integrating the terms that are more appropriate.

Another problem involves co-ordination, which appears to be one of the linguistic problems faced in performing information searches. This problem arises because the English Language is rich in synonyms, antonyms, quasi synonym, acronym and new terms. Examples of these are as follows:

Elementary schools and primary schools
Universities and colleges
Kindergarten and pre-schools
Economic cost and finance
Third world and underdeveloped and developing countries

COMPONENTS IN INFORMATION SKILLS THAT CAN BE ACQUIRED

The development of information technology and communication (ICT) has resulted in the exponential increase in information and has caused changes in the ways information is being generated, stored and accessed. To ensure society obtained the benefits of information expansion that supports the creation of new innovative ideas, problem solution and achieved goals, society must acquire the knowledge and skills relating to information literacy. Information skills has been referred to as any knowledge and skills that involves cognitive process such as critical, lateral and creative thinking skills and analytical skills that would enable individuals to identify information needs, formulate questions based on needs, generate information search strategies and access, evaluate, synthesize, use and organize information for effective presentation and dissemination.

The Information Literacy Programme

Several models have been developed to analyse the information literacy concept and its relationship with research implementation process. Information literacy can be defined as the ability to articulate one's information need, to identify, locate and access appropriate sources of information to meet the information need, the ability to effectively use information resources, regardless of format, to critically and ethically apply the information and to determine if the need has been adequately met (Juhana 2002, Halimah 2000, Kulthau 1987). Some of the models used today are those that were developed by Kulthau (1987), Irving (1985), Halimah (1999) and Fjallbrant (1996). As a generalization, all the models included similar elements as illustrated in Figure 1.Based on this model, the writer has attempted to stress several elements of aspects of teaching specific information skills, which has not been much emphasized in other models. Emphasis is given on the following aspects:

- integrating cognitive elements,
- thinking skills,
- strategies in the information research process.

All the elements above are further explained in the model developed by the writer known as “The integration of cognitive and strategies in information skills components” as conceptualised in Figure 2. In integrating cognitive skills in information skills, one can use cognitive skills to identify the development of knowledge and concepts in the subject area of interest and being explored, using thinking skills such as mind mapping, and the skills in identifying the information

sources that are suitable to one's need. Several questions may be asked by researchers are:

- What aspects are known about this phenomenon?
- What is meant by concept X?
- What are reasons for needing more information on concept X?
- What are the problems or research questions?
- Where can the related information be obtained?
- What related information is needed?
- How to use and manipulate information that obtained?

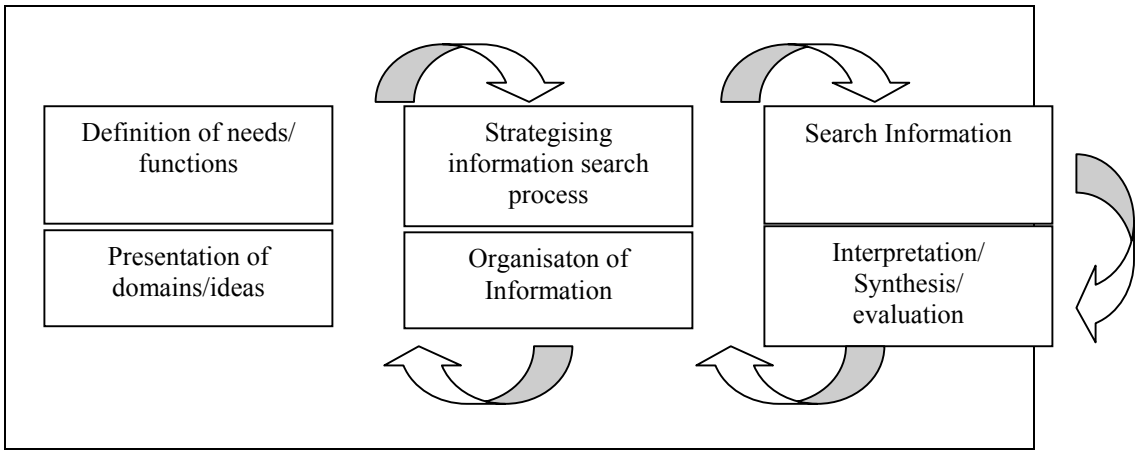

Figure 1: Elements in Models of Information Literacy Programmes

The cognitive process that can be applied may involve the researcher to ask the questions as mentioned earlier, so that the following strategies can be designed. For example, in order to know more about the concept 'X', the strategy that follows would involve looking up the meaning from the encyclopedia (in hardcopy or online encyclopedia). The next step is to ask if there are any synonymous and related terms. Having identified all the relevant terms and if the subject to be searched involves the use of a set of combination of terms, what is the best search approach or techniques that can be applied to search from the OPAC, CD-ROM or the Internet. The cognitive process as explained above can be applied in other research processes.

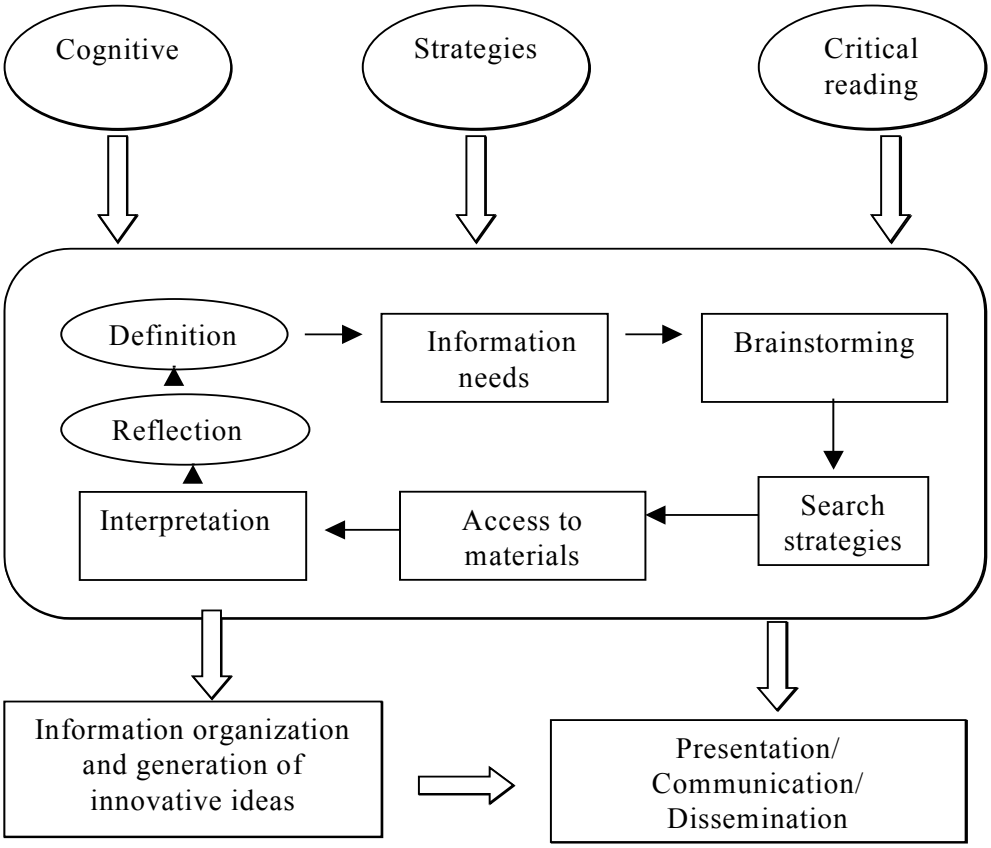

Figure 2: Model of the Integration of Cognitive Skills and Strategies in Information Skills

Other strategic approaches that can be applied would involve further cognitive processes such as to think of alternative use of concepts as a result of reading the initial sources acquired from the initial searches made. One can also apply the components in critical thinking such as analysing the information obtained, looking for similarities and differences, evaluating the validity of the information at hand, looking for the factors contributing to the success of similar projects that the researcher is undertaking, and checking for assumptions made as opposed to objective statements. The two components, critical thinking and search strategies can also be integrated in surfing the Internet so that searching can be done more

effectively. Table 2 provides examples on how one can develop skills in effective Internet searching (http://www.lib.edu/TeachingLib/Guides/Internet/ Strategies.html). Besides the search techniques, it also presents information about the characteristics of each type of search tools, as it is important for a researcher to know something about search tools before undertaking further steps to search the Internet.

Table 2: Examples of How One Can Develop Skills in Internet searching

YOUR TOPIC'S FEATURES:	SEARCH TOOLS	
	Online public access catalogues (OPAC)	Search Engines & Meta-Search Engines for searching the World Wide Web
Vital information on search tools.	Most OPACs allow one to search the collections found in a particular library or group of libraries. One can Search by author, title, keyword and by subject.	Search full-text of selected Web pages Search by keyword, No browsing, no subject categories. Meta-Search Engines quickly and superficially search several individual search engines at once and return results compiled into a convenient format.
Recommended tools	One can get access to OPAC by typing the URL address of the library and hyperlink into Library Catalogue.	Google, Alta Vista Advanced Search, Northern Light Power Search, Alltheweb Meta-Search Engines: Metacrawler, Ixquick, Copernic, Webferret and others.
Distinctive or word or phrase? e.g. Human resource management	For subject approach, refer LCSH, e.g. Human resource management USE Personnel management	Enclose phrases in "Human resource management" or " Personnel management". Test run your word or phrase in Google or Copernic/Webferret.
No distinctive words or phrases	E.g.:Islamic law on labor , Look for broad subject first, under: Islamic law, look for -Labor laws and legislation (Islamic law)	Use search engines that let you combine terms using AND or + e.g: Use Advance Search in Alta Vista and Google. If use Excite: AND,OR, AND NOT (must be capitalized): e.g." Islamic law" AND "labor"

Seek an overview?	For overview of book on human resource planning, look under broad subject heading: Personnel management	Use field limiting: Title: "human resource planning" or Other fields: url: host: domain: In Webferret, Choose exact phrase.
Narrow aspect of broad or common topic? Use sub-searching approach	For cases in personnel management, use Personnel management – case studies.	Northern Light's folders; or AltaVista's search in results. In Webferret, Choose, AND, OR and exact phrase.
Synonyms, equivalent terms, variants	Look for human relation from LCSH. You will be referred to the terms used. e.g. human relations USE Interpersonal relations	Choose search engines with Boolean OR (In Northern Light & Fast Search enclose terms in ( ). E.g.(human relation)(public relation) For truncation (In Alta Vista use *)
YOUR TOPIC'S FEATURES:	SEARCH TOOLS	
	Subject Directories & Gateway Pages	Specialized Databases "Invincible Web" (defined below)
Vital information on search tools.	Selected sites picked by editors or experts in a subject) Usually organized into hierarchical subject categories. Often annotated. Can browse subject categories or search using broad, general terms NO full-text of documents.	The "Invincible Web" provides access through a search box into the contents of a database in a computer somewhere. Can be on any topic, can be trivial, commercial, task-specific, or a rich treasure devoted to your topic. Locate specialized databases by looking for them in good Subject Directories like the in Librarian's Index, Yahoo!, or AcademicInfo; special guides to searchable databases; and sometimes by keyword searching in general search engines
Recommended tools	Librarian's Index, Yahoo! or Academic Info;	Complete Planet, Copernic
	Search the broader concept, what your term is "about." e.g. Look for subject or gateways for business, management etc. Try to find distinctive terms in hand-selected web pages or a Gateway Page	Want data? Want specific resources? Schedules? Maps? Take a look. Hard to predict what you might find on the Invisible Web.

Where to begin?

It is recommended to begin with different types of search tools, depending on what one knows about one's topic and what one wants to know. Each of these questions can provide the researcher with the direction where to begin.

- Do you want broad information?
- Are you looking for something very specific or perhaps a unique term or phrase?
- Are you looking for a narrow aspect of a topic with a huge Web presence?
- When you search, are you overwhelmed by too many or off-target results?
- Are there a lot of synonyms of equivalent terms for what you seek?

It is a good idea to vary the search strategy and learn as the searching process takes place, choosing the optimal approach for each stage of the process. This is basically because finding information on the Web is a process. If one has exhausted the options above, the next step is to ask someone through a discussion group especially when are seeking information that is of "international" in nature. Before using the information that has been accessed, researchers need to analyse its contents. The analysis of information involves critical reading so that the evaluation made can assist one to identify other aspects that need to be searched to answer other research questions that are related to the topic to be covered. Evaluation technique is important and can be applied by using critical and lateral thinking.

Critical and Strategic Reading

Critical reading is considered one of the important components in information literacy. The processes in relating information, concepts, ideas and facts involve one to (a) scan and understand the content that is being read and relate the information obtained with the knowledge that one has in the subject explored; (b) select and filter only relevant and related information and ideas; and (c) have note-taking skills, writing skills and presentation skills. This component stresses on the skills to analyse or self evaluate so as to enable one to reflect on the process involved and identify aspects that can be improved. Evaluation can be done by integrating cognitive process which involved posing questions to confirm the reliability and validity of the information at hand. It is a known fact that not all the information on World Wide Web (WWW) is useful, valid and reliable. The following questions can be used to critically evaluate the information obtained from the WWW, on the aspects of content, source and date:

(a) Content

- Who is the target audience? What is its content?
- What is the purpose of the website constructed?

- What is the relative value of the website compared to other information available in the topic that is being researched?
- Is the website comprehensive as compared to other related websites?
- Is the text written in correct grammar, spelling and has a clear writing style?

(b) Source and date

- Who is the author or the web developer?
- What is the authority or expertise of the author? Is he/she knowledgeable in the subject covered in the web document?
- When was the website constructed and updated?
- To what extent are the hyperlinks valid and relevant?

Integrating critical thinking skills in managerial decisions or policy making

While analyzing the sources of information one is advised to constantly refer to the conceptual framework designed to address issues on aspects that are related and relevant. While reading, it is encouraged to construct mind maps as this can enhance one to think and reflect critically so that one can see issues, patterns, trends that enables one to make decisions or policies more intelligently, pragmatically and to ensure success and achievement on what is presently being undertaken. For example, in making changes to any particular policies relating to training programmes that would affect the planning of future human resource development, a HR manager would conduct a well structured research, a thorough information search to look for all possible documents, print or electronic. From the review of literature of topics, one can integrate critical thinking components by means of looking at similarities and differences, analysing the factors that contributed to the success and failures of certain programmes, practices in other countries and look at other studies before designing constructs to endeavour on the gathering of data. Research can be of two types, that is, by reviewing related literature and previous empirical research, case studies, and looking into related theories and principles; and the other research involves the gathering of data from selected sample which is relevant to the study in order to find answers to more specific research questions. After information gathering, critical thinking and lateral thinking can be applied to analyse and synthesize information, data or facts that have been collected.

CONCLUSION

Comprehensive information gathering process is important so that one is exposed to all possible perspectives and alternatives that should be given attention to, before any decisions or policies are to be implemented. Thinking laterally and critically

would enable one to refrain from mere perceptions to making decision that is innovative yet pragmatic and feasible. Lack of information skills and utilising the components in information literacy may result in the wrong decisions being made and that may be detrimental to the development of the nation. The awareness on information literacy among managers need to be enhanced, in view of the fact that knowledge on information skills is vital in this competitive global market and modern management that requires managers to be versatile.

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