THE ROLE OF KNOWLEDGE BASED SYSTEM IN SUDANESE HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

Knowledge based Systems (KBS), is IT tools focuses on systems that use knowledge-based techniques to support human and has become one of the basic pillars of modern society. Higher education needs to develop considerably therefore; educators and policy makers should take consideration by adding the value that IT tools can offer to the education system as well as to design the suitable action that will guarantee most appropriate uses from educational perspective, as well as the most efficient uses from technological aspects.

Due to the current globalization, Sudanese higher education Institutions (HEI) were facing challenges of global competitiveness, the mission for competitiveness and sustainability has led to implementing of the efficient use of knowledge and information technologies as an essential element of global sustainability. The Quality of Education in Sudan being offered in institutions of Higher Education and it is a question being debated widely; therefore this research paper will focus on what is the role of KBS in the improvement of Sudanese HEI. It then synthesizes knowledge management features with to designing knowledge initiatives to achieve a strong base for higher education growth. The researcher collected data from Different universities in Sudanese HEI. The research questionnaires were distributed to 400 questionnaires in the three selected universities, only 164 usable questionnaires were returned, yielding a response rate of 51%. Descriptive Statistics and multiple regression analysis were used to analyze the data collected.

The Results of the Regression Model using the Enter Method between the independent and the role of KBS in Sudanese HEI shows four independent variables, namely Retain Expertise and satisfaction, improve the students and teaching accessibility, Support students /teacher to adopt better pedagogical and Provide over all Research Base Education were found to be significantly associated with the role of KBS in Sudanese HEI while the Provide learning Workspaces and sharing knowledge found not to be significant to the role of KBS in Sudanese HEI.

Keywords: Knowledge Management, Knowledge-Based Systems, Role of Knowledge-Based Systems, Sudanese Higher Education

INTRODUCTION

Knowledge-Based Systems Interested on systems that use knowledge-based tools for all human activities including decision-making processes, learning development. These systems will play an important role in the most HEI particularly as the world today is moving towards to so-called knowledge-Based society.

In the society of the knowledge-Based, education will play the main part in the method of life exact to this education and knowledge based society. Knowledge based systems are able of

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combine forces with users and so the quality of support given and the manner of its presentation are important issues. The emphasis of the paper is on the practical significance of such systems in modern computer development and usage.

This paper highlights some of the roles of KBS in relation to the practices which can be applied by higher education institution which will improve overall development and support the institution to enhance growth.

LITERATURE REVIEW

This section provides a review of the conceptual literature which will inform the frameworks of the study. The literature review for the study includes the Knowledge, knowledge Management (KM), and Knowledge-Base System (KBS). Each of these themes contributes to the foundation for this study.

Knowledge

There is a general consensus in the literature that knowledge is a component of data, while data are raw facts, and information is data that has been processed. Therefore knowledge is information processed with guidance as the guidance approached skills (Ergazakis, 2008; Kankanhalli et al., 2005; Lo, 2009).

Knowledge Management

Horwitch and Armacost (2002) initially defined KM as the creation, retrieval, alteration, and storage of accurate knowledge and information in order to prepare better strategies, adjust actions, and deliver results how and when they are needed.

Knowledge-Based Systems

The Knowledge-Based System (KBS) (generally IT-based) refers to managing knowledge in organizations by supporting creation, capture, retrieval, access, storage, and dissemination of knowledge to the users using a computer system (Maier, 2007).
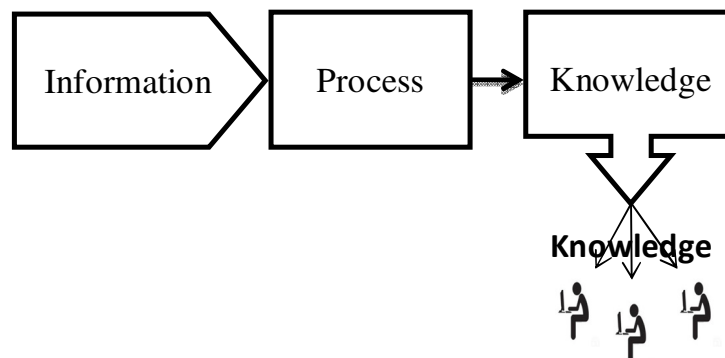

Figure 1. Knowledge –Based System Structure

SUDANESE HIGHER EDUCATION

The growth of higher education within the context of Sudan development faces the failure to nurture conditions in which the individuals with high education qualifications can be productively employed.

In view of the comprehensive advances in KBS and the emerging concept of knowledge based-society, the vitality and evolution of new educational institutions are essential to address the development needs of the society.The creation of new institutions for knowledge

based-society are viewed as critical in identifying problems ahead of time, generating the information required to properly understand the nature of these problem, analyzing the gathered information with the requisite speed using the most appropriate tools and using the results to formulate the most appropriate policy alternatives. Nowadays, KBS make extensive use of ICT, especially the knowledge base and Internet because of its potential in advancing interactivity between users.

KBS FOR EDUCATION INSTITUTIONS IMPROVEMENT

The KBS provides a great possibility to the education institutions and the Knowledge-based system can be used by users to help make more informed decisions regarding the education institutions management of variations in activities by providing access to timely information. This will support the professionals to improve designs for educational activities because the variations can be recognized at the early phase of design where the impact of variations is not severe. Here it is consequently important to realize that the knowledge-based system (KBS) is not designed to help only in the decisions making processes only, but rather it provides relevant information in a competent and easy access design that allows users to make more knowledgeable decisions. Even this system is also provides additional applicable evidence and facts to facilitate the human experts learned from earlier period experiences.

The Knowledge and a range of filters that can be applied to the knowledge-base developed will support the professionals in learning from past experience for improving future designs and enhancing management of variations in educational activities (Bahlmann, 2008).

The KBS process address the education institutions to identify the problem and support for decision making and problem solving providing flexibility and innovation. The KBS will continuously implement improvement to facilitate and provide the implementation of practices to achieve higher performance and efficiency for education institutions. The knowledge which is shared and transferred through KBS should be well organized for easy access and adopting in education institutions.

THE ROLE OF APPLYING KNOWLEDGE MANAGEMENT IN EDUCATION

Applying KBS in education institutions which supported by ICT will be add improvement for the education institutions. In the recent years, the education institutions are looking forward for the growth in form of e-learning, cyber universities, and virtual universities around the world which provides tremendous opportunity for the potential students to choose for variety of courses at the click of the mouse. Petrides & Guiney, (2002) explained that KBS can be used to support educational administration, which in turn supports teaching and learning.An institution extensive approach to KBS can guide to exponential improvements in sharing knowledge both explicit and tacit, subsequently rush benefits.

ROLE AND REASONS FOR ADOPTING KM IN HIGHER EDUCATION

The study conducted by International data Corporation and knowledge management magazine (Dyer, 2001) among various institutions which represented the role and reason for the use and adoptions of KBS are:

1.   Retain expertise of persons and Increase their satisfaction. The implementation of KBS will helps to keep the experience and then take advantage of them when needed, which greatly facilitate the speed and processes of decision-making.

2.   Provide learning workspaces and Sharing knowledge among different users in the university/ higher education institution; the KBS provides and expand the areas

of work for the persons which increases in employment opportunities for them and different areas

3. Improve student accessibility towards learning and Develop an action plan to improve teaching process. The KBS enable collaboration sharing, categorizing, distribution and storing of knowledge and information for both academic staff and students which can later be retrieved and accessed as important diagonally different contexts.

4. Support students and teacher to adopt better pedagogical tool by Supporting universities/ college / institution to improve databases, records, alumni services and management. Pedagogical scripting allows teachers to better plan their courses and this will be reflected positively in the students' performance.

5. Provide research base education at higher level for development then will assist academic staff with new skills; provide training. So the KBS implementations will provide guidance for the researcher in term of their strategy, contents structure, and sources of the specific scientific researches.

THE PROBLEM

Despite the growing literature in the area of knowledge-based systems, it is not known why the development of knowledge based systems is still very low, especially in current Sudanese higher educations. Could it be a reflection of the less acknowledgement of the role of KBS in the current Sudanese HEI? Based on the problem raised the following research question is posed:

What are the Roles of knowledge based system in Sudanese Higher Education's Institutions?

RESEARCH MODEL

The following research model (Figure 2) was developed based on the role of applying of KBS in Sudanese Higher Education's identified in the literature in order to assist this study in answering the above questions.
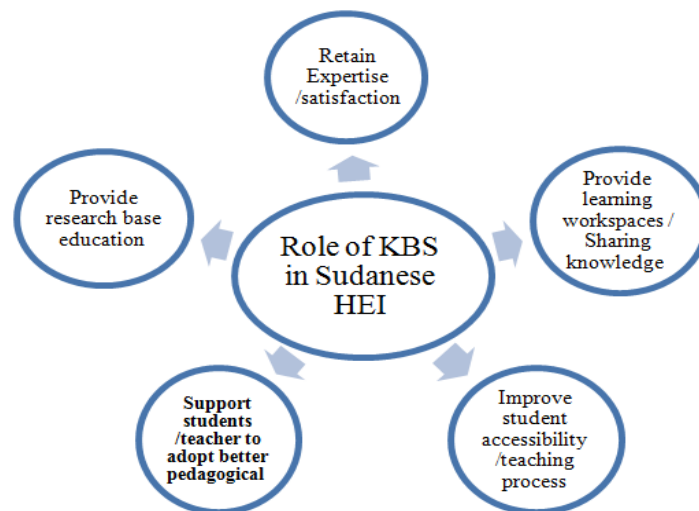

Figure 2. The Role of KBS in Sudanese Higher Education Institutions

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METHODOLOGY AND SAMPLING

Descriptive statistics techniques will be use to analyze the data. The questionnaire technique of data collection will be used. Inferential statistics techniques will be used to try to infer from the sample data what the population thinks and to make inferences from the data to more general conditions. A multiple Sudanese universities/ Colleges will conduct purposively to select the participant of the questionnaire. The selection of these participants was based on their specialization. Statistical Package for the Social Sciences (SPSS) will be used to answer the research question.

There are approximately 90 university / College in Sudan with a target population of approximately 500,000 students and 5300 academic staff. The sampling frame population for the paper was 850 persons. The purposive sampling method was used to select the field and the convenient sampling method (availability) was used to distribute the questionnaire.

Even though 400 questionnaires were distributed to the participants, only 210 questionnaires were successfully collected. Of the 210 (51.21%) questionnaires that were returned successfully, only 164 (41%) copies were completely answered. The remaining of 46 questionnaires could not be included in the study due to incomplete data or poor responses (see Figure 3).
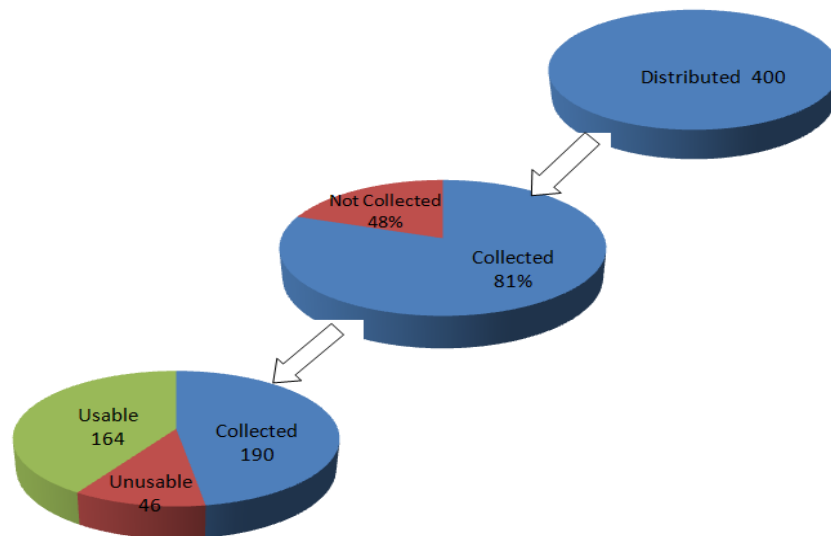

Figure 3. Students Response Rate

DATA ANALYSIS AND RESULT

Quantitative approach was used to answer the question about the Roles of knowledge based system in Sudanese Higher Education's Institutions from the participants' point of view. This will include data has been collected from multiple Sudanese universities/ Colleges to select the participants of the questionnaire.

Demographic Profile of the Respondents

The first part of the questionnaire collected information on gender, age, nationality, education type, and the education specialist in the selected Sudanese HEI. Table 1 presents the demographic profile of the participants who responded to the questionnaire and the frequency distributions.

Table 1. Demographic Profile

Category	Response	Frequency	Percentage
Gender	Male	95	57.9
	Female	69	42.1
Age	16–25	34	20.7
	26 – 39	86	52.4
	Above 40	44	26.8
Nationality	Sudanese	153	93.3
	Other	11	6.7
Education Type	Diploma	19	11.59
	Bachelor's Degree	102	62.20
	Master's Degree	39	23.78
	PhD	4	2.44
Education Specialist	Engineering	25	15.2
	Information Technology	81	49.4
	Social Science	19	11.6
	Medicine	9	5.5
	General Science	18	11.0
	Other	12	7.3

Analysis of role of Applying Knowledge Management in Education

The Cronbach's Alpha ' ' values of all (variables) are greater than 0.7, (See Table 2). Hence, each item correlates "adequately" within the construct. Cronbach's Alpha value of 0.7 or higher suggests good reliability and indicators of this model's constructs' validity are good (Hair et al, 2006).

Table 2. Internal Consistency Reliability for KBS roles in HEI

Role of KBS in Sudanese HEI	Cronbach's Alpha
Retain Expertise /Satisfaction	0.847
Provide learning Workspaces and sharing knowledge	0.933
Improve student accessibility /teaching process	0.849
Support students /teacher to adopt better pedagogical	0.927
Provide Research Base Education	0.868

The Relationship between the Dependent Variable and the Independent Variables Using Regression

The regression was used to identify the predictors of the use of KBS in Sudanese HEI. Table 3 shows the results (significant) of the regression model applied between the dependent variable (the role of KBS) and the independent.

Where the significance value ($p < 0.05$), confirms that the variable is related to and significant with dependent variable (Bartlett, 1937). Therefore all four variables includes independent variables, namely Retain Expertise, improve the students/ teaching accessibility, Support students /teacher to adopt better pedagogical and Provide Research Base Education were Significant positively while only one variable namely Provide learning Workspaces and sharing knowledge is Significant negatively ($p > 0.05 = .962$).

The highest VIF (Variance Inflation Factor) value is 1.365 where below 5, and then there is no problem of Multicollinearity (Hair et al., 2006).

Table 3. Results of the Regression Model

Model	B	Std. Error	Beta	T	Sig.	VIF
Retain Expertise /Satisfaction	.337	.061	.337	5.72-	.000	1.112
Provide learning Workspaces	-.005	.064	-.005	-.049	.962	1.196
Improve student accessibility	.227	.063	.227	3.803	.000	1.016
Support students /teacher pedagogical	.225	.058	.225	3.805	.000	1.010
Provide Research Base Education	.109	.066	.109	1.693	.023	1.251

Results of the Analysis using the Enter Method Regression

The Results of the Regression Model using the Enter Method between the independent and the role of KBS in Sudanese HEI shown if figure 4. Four independent variables, namely Retain Expertise and satisfaction, improve the students and teaching accessibility, Support students /teacher to adopt better pedagogical and Provide over all Research Base Education were found to be significantly associated with the role of KBS in Sudanese HEI see figure 4.
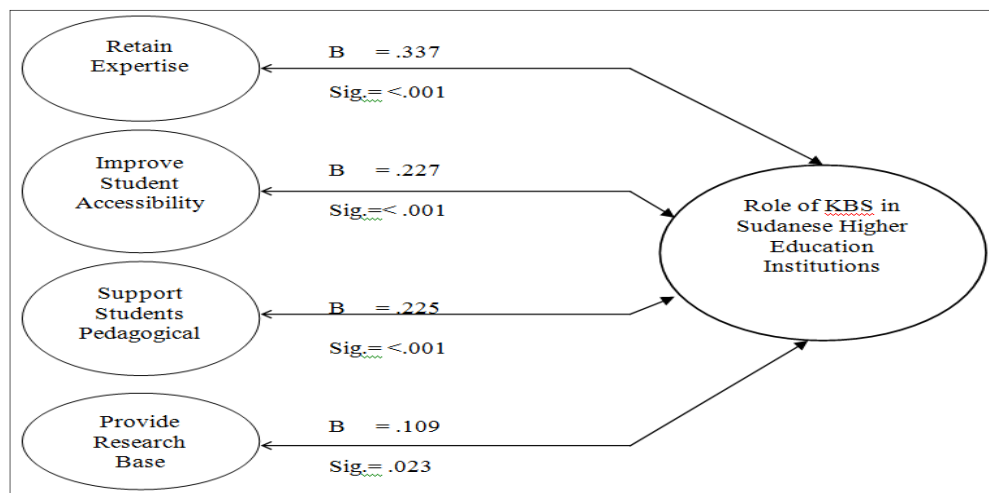

Figure 4. Results of the Analysis using the Enter Method Regression

DISCUSSION CONCLUSION

The KBS offer very powerful instruments to bring higher education institution in the Sudan. However, as has been stated in several of the studies reviewed, the KBS by itself is not a solution to any development problem; it only provides an opportunity. This research paper explore the experience resulting from these attempts worldwide, and implying the same practice in growth of Higher Education in Sudan with a focus on the potential of the KBS to enhance access, efficiency, quality, and management of overall educational institutions in Sudan.

Of the overall roles, Retain Expertise and Satisfaction made the greatest statistically significant contribution to the role of KBS in Sudanese HEI. It is observed that KBS is the indisputably key enabler in the implementation and the use of KBS in Sudanese Higher Education's institutions and it is a critical success in sustaining competitive advantage; however, doing so is an ongoing challenge for most Sudanese HEI.

Improve student accessibility and teaching process is the second most important role that is statistically significant to the role of KBS in Sudanese HEI. The process will provide advanced teaching methods for teachers in special settings. Therefore it will improve and enhanced the student's accessibility.

The third role that is significant to the role of KBS in Sudanese HEI is Support students and teacher to adopt better pedagogical. The attitudes derived from aggregating all the benefits that students hopes to receive from interaction with the KBS. The core values of students are critical to the successful use of a KBS. In general the quality influences approach and performance in a KBS approach is also effective.

The fourth role that has a significant to the role of KBS in Sudanese HEI is Provide overall Research Base Education; they agree that the use of KBS will increase the overall innovation performance and effectiveness of the scientific researches in Sudan because it will facilitate and provides the related sources for the researchers in different areas and also will provide them with experience of expertise professors in order to help them.

Provide learning Workspaces and sharing knowledge found not to be significant to the role of KBS in Sudanese HEI due to the lack of KBS jobs in Sudan in addition it is a new field and it is not known for most Sudanese institutions.

The Limitations of this study is the participant of our questionnaire survey conducted within a specific Sudanese university or participants, the results of the study therefore may not be generalizable to all other institutions, the study was in conducted in only specific Sudanese education institutions, the results may not be more accurate to all other institutions.

Challenges for Implementing KBS in Sudanese HEI includes: Lack of KBS tools and techniques Relative, low level of awareness and understanding of the topic, Lack of implementation of research based system in term of KBS.

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