

Impact of Expert System as Tools for Efficient Teaching and Learning Process in Educational System in Nigeria

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Abstract: Introducing an expert system as tool in the teaching and learning process in the Nigeria educational system is a much needed step to improving the process, this is because it is filled with a few challenges involved. The advent of computer system has definitely opened way to Computer Aided Instruction (CAI) for which an expert system is one. An expert system is a well known area of artificial intelligence which is a computerized tool designed to enhance the quality and availability of knowledge required in educational system. The general society sees CAI/expert system as inevitable and a must in teaching and learning process. Borrowing a leaf from the civilized world in their knowledge preservation and distribution, it now becomes necessary for the Nigeria educational system to adopt CAI, and especially expert to duplicate the rare knowledge and experience of a few experts in different fields of education and to place the Nigerian educational system at par with their international counterparts. Though expert system has enormous benefits, they remain un-established as a useful technology due to few research and documentation. This research work proposes that the effective introduction of expert system in teaching and learning process in Nigerian educational system should be adopted as its advantages over traditional chalk-talk method is innumerable.

Keywords- Expert system, Knowledge-based, Inference engine, Human expert, User-interface.

I. INTRODUCTION

The capacity of information and communications technology (ICT) has grown exponentially over the last 10 to 15 years. IDA report emphasized that the information and communications technology (ICT) sector has undergone a revolution over the last decade in all developing countries. The performance of the sector has been driven by market liberalization, which has in turn stimulated private sector investment and competition. This, to a great extent has made impact on the education sector. There is no doubt, changes in the following have evolved due to ICT:

- Teaching and learning practice in institutions of any level.
- New teaching ideas, approaches and methodologies have being developed, relying on ICT, for example distance education, home schooling, cross curriculum, and virtual reality.

The advent of computer has help to revolutionalize the globalization process. The use of computer has also evolved systematically in the education sector. Four phases in the history of computer in education to include the:

- Late 1970's – early 1980's: programming, drill and practice

- Late 1980's – early 1990's: computer based training (CBT) with multimedia and internet based training (IBT).
- Late 1990 – early 2000: e-learning
- Late 2000: social software and free and open content.

ICT over the past decade developed or evolved through various stages. But the most recent in this period is that of e-learning with its main point being to deliver learning (courses) to students. Later on, the learning platform developers have become more aware that learning requires social activities among the learners themselves and the teacher. Thus social software such as blogs and wiki's with free and open content where developed for easy accessibility and are easily editable.

Ani in Osaat (2013) defines ICT as an electronic-based system of information transmission, reception, processing and retrieval. He further highlighted the constituent components of ICT to include computer software, networks equipment, satellite lines and related systems that allow scientist to access, create, exchange, communicate and use data, information and knowledge. He went further to state that ICT is an electronic technology used in collecting, storing, processing and communicating information. Osaat (2013) noted that the place of ICT as a proactive measure in

the management of school records cannot be over-emphasised, pointing out that the use of ICT is of immense benefit to effective management of records in schools.

The use of ICT will lead to easy programming and processing. ICT will help the organization or the school to eliminate waste and increase performance. The huge manpower spent exercise can be drastically reduced with ICT to enhance overall management procedure. The use of computers bring great speed and accuracy to each task of the school administration. It is also convenient to store large quantities of information on small disks and tapes.

Adesope (2004) observed that information technology can be described as computer-related mechanisms through which information is obtained and shared with relevant users. Useful information technologies noted according to Metcalfe and Gilmore (1990) were Compact Disk - Read Only Memory (CD-ROM), local databases, electronic publishing and the expert systems. Of all these technologies the expert systems was noted as having the most potential to deliver information and knowledge beyond the agricultural research community and into the realm of the extension worker and even to the farm manger. The expert system according to Hopper and Mandell (1984) is simulation and modeling system that contains programmed facts to imitate human decision-making. An expert system is computer software that attempts to act like a human expert on a particular subject area. It uses a knowledge base of human expertise for problem solving, or to clarify uncertainties where normally one or more human experts would need to be consulted.

Nwigo (ud) stated that an expert system is computer software that attempts to act like a human expert on a particular subject area. it uses knowledge base of human expertise for problem solving or to clarify uncertainties where normally one or more human expert would need to be consulted. Knowledge-based expert system or simply expert system use human knowledge to solve problems that normally would require human intelligence. These expert system represent the expertise knowledge as data or rules within the computer. These rules and data can be called upon when needed to solve problem. Books and manuals have tremendous amount of knowledge but a human has to read and interpret the knowledge for it to be used. Conventional computer programs perform tasks using conventional decision-making logic containing little knowledge other than the basic algorithm for solving that specific problem and the necessary boundary conditions. This program knowledge is often embedded as part of the programming code, so that as the knowledge changes, the program has to be changed and then rebuilt. Knowledge based systems collect the small fragments of human know-how into a knowledge-base which is used to reason through

problem, using the knowledge that is appropriate. A different problem, within the domain of knowledge-base, can be solved using the same program without reprogramming. The ability of this system to explain the reasoning process through back-traces and to handle levels of confidence and uncertainty provides and additional feature that conventional programming does not handle. Most expert system are developed via specialized software tools called shells. These shells are equipped with an inference mechanism and require knowledge to be entered according to a specified format. They typically come with a number of other feature, such as tools for writing hypertext, for constructing friendly user interfaces, for manipulating lists, strings, and objects and for interfacing with external programs and databases. These shells qualify as languages, although certainly with a narrower range of applications than most programming languages.

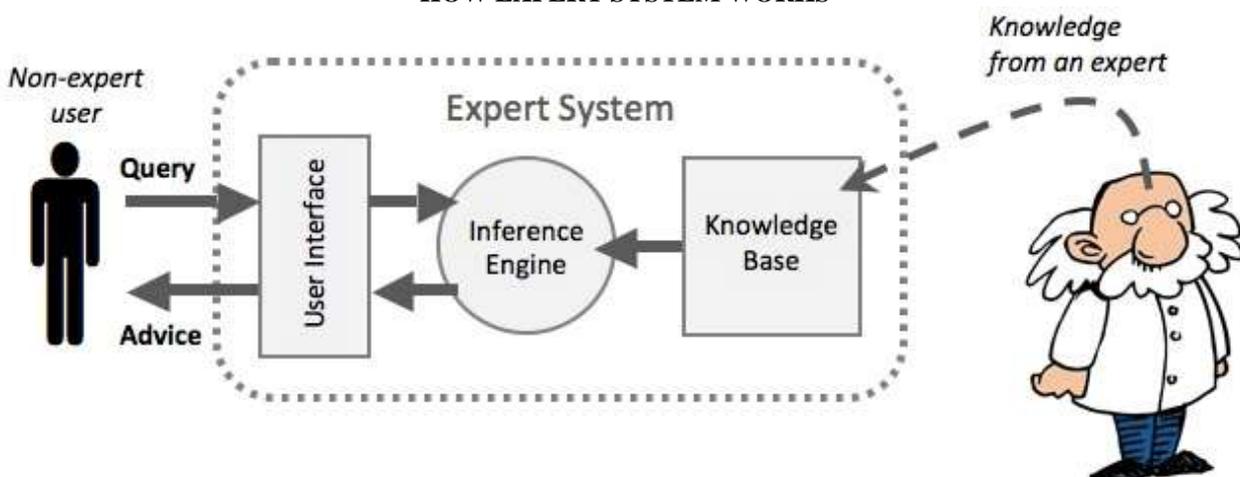
In educational field, many of the expert systems application are embedded inside the Intelligent Tutoring System (ITS) by using techniques from adaptive hypertext and hypermedia. Most of the systems usually will assist student in their learning by using adaptation techniques to personalize with the environment, prior of student and students ability to learn in terms of technology, expert system in education has expanded very consistently from micro computer to web based (Woodin, 2001) and agent based expert system, it can provide an excellent alternative to private tutoring at anytime from any place (Markham, 2001) where internet is provided. Also agent based expert system surely will help users by finding materials from the web based on users profile. Supposedly, agent expert system should have capability to diagnose the users and giving the results according to the problems. Besides the use of expert system in technology, it also had tremendous changes in the applying of methods and techniques. Starting from a simple rule based system, currently expert system techniques had adapted a fuzzy logic (Starek, Tomer, Bhaskar, and Garcia, 2001) and hybrid based technique (Pretzas, Hatzilygeroudis, and Koutsojannis, 2001).

Satvita, Akhil and Manoj (2010) opined that expert systems offer an environment where the good capabilities of humans and the power of computers can be incorporated to overcome many of the limitations. They observed the benefits of expert systems to include: 1. Increase the probability, frequency, and consistency of making good decisions. 2. Help distribute human expertise. 3. Facilitate real-time, low-cost expert-level decisions by the no expert. 4. Enhance the utilization of most of the available data. 5. Permit objectivity by weighing evidence without bias and without regard for the user's personal and emotional reactions. 6. Permit dynamism through modularity of structure. 7. Free up the mind and time of the human expert

to enable him or her to concentrate on more creative activities. 8. Encourage investigations into the subtle areas of a problem. 9. Expert system gives emphasis on individual student by keeping record of their learning ability and speed. 10. Expert system provides a convenient environment to ask queries and find out their solutions. 11. Expert system also gives a congenial way to find out errors and fix them. In the same vein, Markham (2001), stated that expert systems are beneficial as a teaching tool because it is equipped with the unique features which allow users to ask question on how, why and what format. When it is used in the class environment, surely it will give many benefits to students as it prepare the answer without referring to the teacher. Besides that, expert system is able to give reasons towards the given answer. This feature is really great as it make students more understanding and confident with the answer. Expert system also has provided excellent alternative to private tutorial, the system is usually developed using Java technology, thus making it interoperable and independent

platform (Markham, 2001). Ability of expert system to adaptively adjust the learning is another feature that makes expert system more demanding for students. This feature is used in engineering students, it would be able to monitor student progress and make a decision about the next step in training. Expert system has been used in several fields of study including computer animation (Victor yee, 1995), computer science (Heather Christine Markham, 2001), engineering (Zorica, Vladmir and Machotka, 2002), language (Expert system in language teaching), and business study, for computer animation production, expert system has been used as a guide by developer to design 2D and 3D modeling package, other than that expert system is also used as tool in teaching mathematics related subject. Among other things, the expert systems will be of significant benefit to impart knowledge to the students and staff, to improve the teaching and learning process; for effective teaching process and for effective teaching service.

HOW EXPERT SYSTEM WORKS



OBJECTIVES OF THE STUDY

- process

The main objective of the study is to examine impact of expert system as a tool for efficient teaching and learning process in educational system in Nigeria, using University of Porthacourt as a case study, .Specific objectives are as follows.

- determine the extent to which expert systems influenced performance of students in the study area
- determine the extent to which human expert influenced performance of students in the study area
- determine perception/satisfaction of teachers and students on application of expert systems in the teaching and learning

SCOPE

Between the student of faculty of sciences and faculty of engineering

SAMPLE SIZE: Simple random sampling, whereby 150 students were randomly selected from faculty of sciences and 150 students from faculty of engineering .

POPULATION OF STUDY

The population of the study is 300 students.

PROPOSED CONTENTS OF THE THESIS

The main propose of this study is to investigate into the impact of expert system as a tool for efficient teaching and learning processes in the educational system in Nigeria.

STATEMENT OF THE PROBLEM

There is no doubt that teaching involves a variety of methods for effective delivery. Over the years several teaching methods have been employed in the teaching and learning process. One of the contemporary techniques is the use of information and communication technology. Ibadin and Imokpokpomwan (2009) opined that technology in contemporary times has advanced to a more sophisticated facility in form of the computer which is increasingly aiding information gathering, storage, processing and exchange, thereby necessitating the birth of a new age called information age and a new economy tagged the knowledge economy. In his own opinion, Siddiqui (2007) explained that the development and implementation of information and communication technology forces today's universities and colleges to respond to societal trends that point to a transformation of our society into a so-called "knowledge economy". It was further stated that globalization and ICT applications place new demands on higher education establishments and hold important implications for their teaching and research functions.

The traditional classroom teaching method such as the chalk and talk method, according to Khanna, Kaushik and Barnela (2010) though may be most popular teaching methodology and may still remain on top for quite some time, has several shortcomings which include limited time spent on various topics, limited access to teachers and difficulty in transferring lecture information to the real world situations. As a result of these shortcomings more innovative and interactive learning methodologies are gaining importance and so is the expert systems in the field of education.

Salekhova, Nurgaliev, Zaripova and Khakimullina (2013) were of the opinion that with the increasing workload and level of qualification standards of a teacher, arises a problem of fast deployment of innovative technologies in education. The process of new technology deployment can stretch in time due to the fact that its author cannot individually teach a large number of teachers instantly. To cope with this problem an Expert System (ES) was developed which is an innovative approach that relies in researching and development of general didactic concepts of defining relationships between levels of correctness of pupils' answers and level understanding of a subject.

The application of ICT in the education sector seems to have made significant effect on teaching and learning process. One form of ICT that proves to be very efficacious in service delivery is the use of expert systems. In contemporary Nigerian education system, there is scanty information on the application of expert systems. This study therefore intends to investigate use of expert systems as a tool for effective teaching and learning process in the educational system in Nigeria.

HYPOTHESES

- there is no significant difference in performance of students exposed to human and expert systems in teaching and learning process.
- there is no significant difference in perception/satisfaction of students on the use of human and expert systems in the teaching and learning process
- there is no significant difference between male and female students performance when exposed to expert systems

METHODOLOGY

One-one distribution of questionnaire and collection , Also collection of data using Algorithm. to analyze the data.

RESEARCH INSTRUMENT

The instrument for data collection will be structured questionnaire, which will consists of two sections, section A will be of 150 items on the prospects of using expert's system package in teaching and evaluation of student learning. Section B will consist of 150 items on the likely problems using the human experts in teaching and evaluation.

VALIDITY OF THE INSTRUMENT

The face validity of the instrument will be carried out by two expert in computer department, my guide and another professor in the department.

RELIABILITY OF THE INSTRUMENT

The reliability of the instrument will be determined in a pre luminary survey of the instruments using lecturers outside the sample frame work. my gudie will suggest the lecturer that will be used to estimate the reliability.

POPULATION OF THE STUDY

The population of the study will comprised of 300 student of the first year of study

ADMINISTRATION OF THE INSTRUMENT

After the teaching of a whole section which will last for 3-4 months for both the experimental and control groups, the researcher will administer the post test to the two groups by herself. Their scores will be organized and mean scores of each group will be determined.

METHOD OF DATA ANALYSIS

The four hypotheses will be tested using t-test statistics level of significance, percentage and frequency The result of the

data analysis will be presented on tables based on the different hypothesis.

DISCUSSION

The discussion of the analysis will be based on the results of the findings.

II. CONCLUSION

Having presented a general overview of an expert system ,and its benefits in the Nigerian educational system, I therefore make the following Conclusions

That there should be a massive awareness and promotion of expert system in Nigerian educational system

That there should be an effective introduction of expert at all levels.

That due to the usual one teacher too many students, expert system should be adopted as a strong assistance for repeated studying and understanding

That there should be continuous research and documentation on expert system towards improving the knowledge base of the system.

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