

## The Integration of ICT in Students Information Database Management System

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### Abstract

*After relying on ICT for individual tasks, learning institutions realized that integration of ICT in student information database management systems is more effective. The study identifies the various benefits and challenges of integration as well as the role of ICT and Database Management Systems. Also, different departments have been discussed with respect to adoption of ICT in their DBMS. In a global context, developing countries are at the peak of technical advancement while developed nations have begun to include sophisticated innovations as the next phase of ICT. The research mentions how ICT integration influences school's operations and its impacts on students.*

**Keywords:** *students, Database management system (DBMS), web-portal, academic records, departments.*

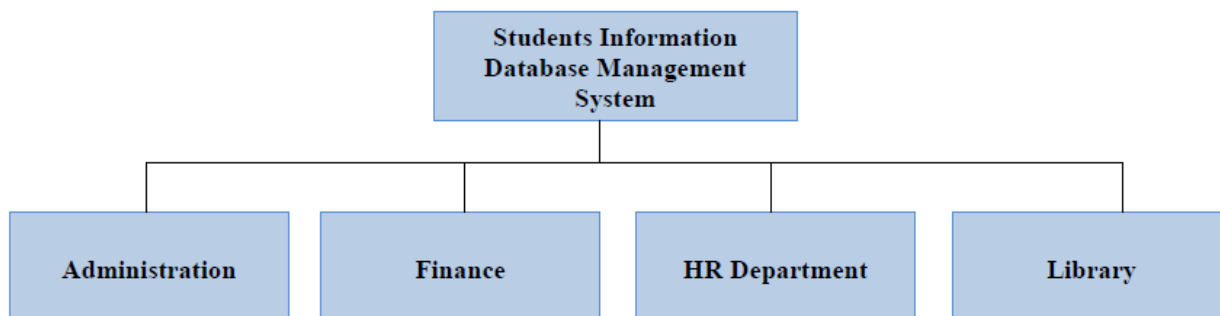
### Introduction

The rapid advancement of ICT has enabled learning institutions to handle complex tasks with little or no effort. Database management systems are designed to safeguard and manage students' information gathered from various departments including admin, finance, and the human resource sector. Data fed into computers include students' personal details, financial history, and performances. For effective communication, academic-based web portals are created to keep students updated, especially if there are changes in timetables, assignments, examinations and any other relevant school activity (Avidov-Ungar, 2017). Integration of ICT has taken root in many public and private universities, colleges, secondary and primary schools.

In the modern society, developed countries are more advanced in technology compared to developing nations. Continents like the United States and the United Kingdom have an easier time adopting new advancements to schools than countries in Africa ("The Adoption and Sustainability of Technology-Enhanced Education in Higher Institutions of Learning in Africa", 2010). In Kenya, the ministry of education has made progress in introducing e-learning and grading systems; however, lack of ICT knowledge among the teaching staff has made it difficult to accomplish the mission. Also, most government schools are in poor conditions; they lack electricity and pupils learn under leaking classrooms. Without a proper room to safeguard data stored in servers, integration becomes a challenge.

In the US, learning institutions use ICT everywhere including grading students. Bio-enhanced systems are being introduced worldwide to secure sensitive information. While it is simple for an expert to hack the system, it is impossible to access data obtained through DNA. Their schools are equipped with enhanced safe rooms and highly trained individuals who monitor and maintain the systems (Wastiau et al., 2013). Unlike developing countries, nations like Japan use sophisticated machines to gather and store student information. Rare cases of hacking are on record, but the data is still vulnerable to viruses. Information available in the database management system can be corrupted easily. To most hackers, it is the simplest and the most secured target to destroy an entire organization especially one without back up. However, new tools and technologies have emerged to resolve major issues including data processing and analysis. Cloud computing is among the evolving trends in ICT that numerous institutions are adopting. More so, the presence of different smartphones has led to the distribution of useful applications that link students with their lectures.

## The Role of ICT in various departments



### Administration

Enrolling new students has become a more manageable task because learning institutions use web-based administration systems to collect the relevant details worldwide. It saves time and money for students leaving far away and minimizes congestion within the organization. Information available in most e-admission portals includes students' requirement, courses available and their schedule, financial options, co-curricular activities, and different recognized student unions.

### Finance sector

Once a student has paid school fees, the finance department is responsible for recording and ensuring that the payment reflects individual payments. The adaptation of online payment methods has made e-learning possible. However, hacking has driven away potential online students from enrolling despite the presence of sophisticated computer programs.

### Human resource department

The department of human resource harbors information related to student performances, discipline, and academic progress. Most inquiries get directed to the HR sector which is well connected to different departments; when the student portal system fails, people then get directed to the HR department.

### Library

The adoption of e-library saw an improvement in learning since books were no longer an issue. It has minimized the number of books lost and torn. Systems installed in libraries keep a track record of students taking and returning of books. In case one has lost a book, they demand a replacement immediately. Otherwise, disciplinary actions are applied to ensure compensation.

### The Advantages of integrating ICT in students' information database management systems

- It enables the provisions of up-to-date information to parents/guardians, teachers, and scholarship boards.
- Updating records becomes less exhausting. Once this system is up & running, you can add more data and get it extracted and run with little effort.
- Tracking a student progress becomes easier because some systems are designed to alert the institute when a student misses three or more periods in a row. Similarly, the history of academic performance for the time in question is readily available by a click.
- It enhances communication within the organizations. Soon, the days of notice boards will no longer exist. Transfer of assignments and continuous assessment testament has evolved to appoint where grading systems help mark the papers.
- It helps reach a wide range of people during admission. Today, an African student can inquire, enroll and study in America without having to travel back and forth.

- Integration decongests departments and enhances smooth operations. Traditionally, students flocked the admission or finance sector for inquiries. Noisy movements along the halls interrupted classes and created chaos when services slowed down.
- It saves time and energy since access to information does not require one to move from one department to another physically.
- Integration of ICT is capable of operating multiple organizations from different countries and using different languages. For instance, Harvard University enrolls students from all over the world; integration made it possible for the organization to diversify.
- Distribution of data within an organization simplifies when successful integration is frequently employed.
- Servers do not take a lot of space compared to the traditional methods of managing academic records. Several people were hired to speed up tasks, but adoption and integration of ICT has eliminated the need for extra staff which cut cost and makes budget allocation effortless (Harvard Extension School, n.d.).

### **The Disadvantages of Integrating ICT in Students' Information Database Management Systems**

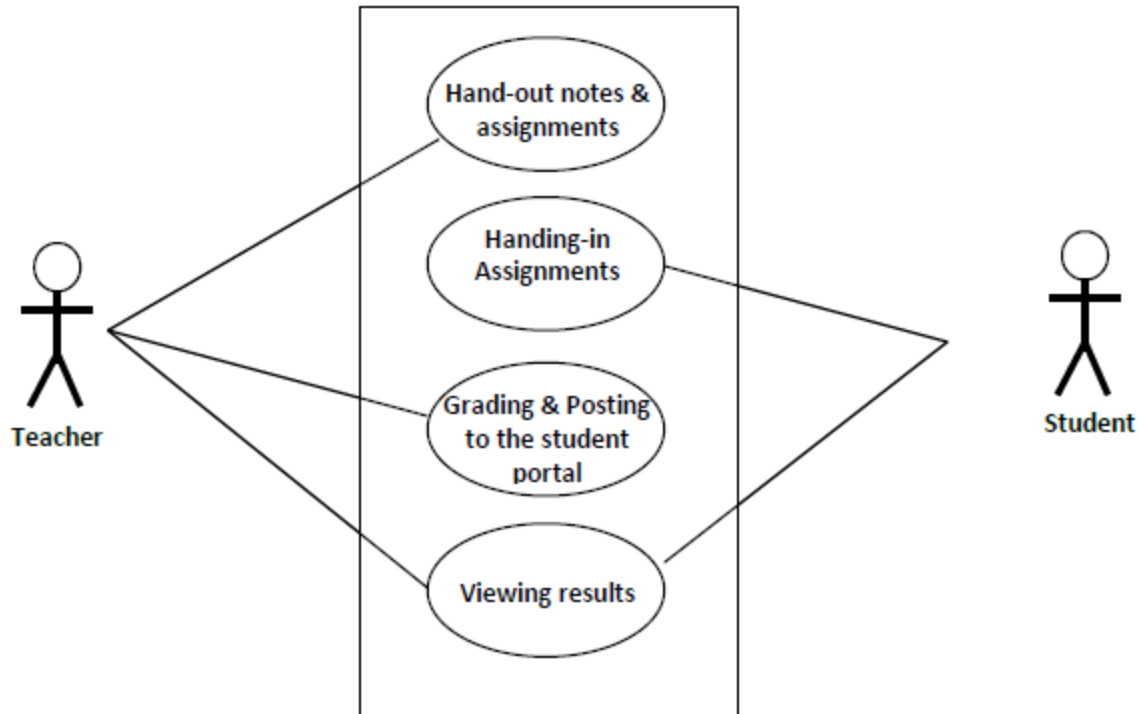
Challenges related to the integration of ICT in learning institutions include,

- Lack of knowledge. Few people possess the right skills for managing database systems. As a field of study, ICT covers a vast area that takes years to master, and it is expensive to learn since colleges and universities charge a substantial amount of money to complete the course.
- Integrating ICT in student information database management system is both expensive in installation and maintenance. Highly qualified individuals demand a substantial amount of money to ensure the system runs smoothly. Also, programs used to ensure data safety come at a higher cost because they require updating now and then. Constructing rooms to secure servers does not come cheap and that includes hiring security personnel to keep outsiders from accessing the expensive hardware.
- It creates confusion and chaos when newly installed. As a result, standard operations are slowed down and loss of time is incurred while users try to adapt to the system. During installation, most programs are shut down as a precaution, but the process also creates an opportunity for hackers to install a backdoor to the entire system.
- System failure is a common challenge in many database management systems. It is mostly caused by overloading, data corruption, or invasion by hackers. Students take advantage of the situation by missing classes, skipping/stealing assignments, and refuse to study.
- Even with the invention of sophisticated programs, hackers are finding ways to manipulate the systems. Cases of fake degrees, diplomas, and grades have been reported.
- Data installed is vulnerable to malfunctions especially if attacked by viruses or worms. Though there are rare cases of data corruption, a motivated person can destroy stored data if he/she has access to the right software.
- In case of a natural disaster, hardware used to store data is prone to destruction. Since it is not possible to completely water-proof servers, a small leakage of water can cause a lot of damage to a building.
- It has created a gap between lecturers and students which has reduced interaction between pupils and their tutors. A teacher's physical presence helps pupils stay alert and makes them understand better.
- It requires regular updates which come in various packages. Distinguishing the legal packages from copyrights is tricky especially if one is looking for a cheaper option (Matyokurehwa, 2013).

For years, ICT has served learning institutions with tools to enhance training. Academic record management systems rose to monitor students from a single server, but the process has distanced students from their teachers. Lecturers have a habit of sending assignments and continuous assessment tests online and expect trainees to forward the papers once they are done. The presence of a trainer in class has a positive impact on a student's progress. An academic material sent for students to study is useless if the teacher is not available to explain the concepts. Instead, it encourages

children to copy from others or purchase assessments online. Despite the challenges, changes brought by ICT integration have not been a complete failure because other than making work easier, it has created employment.

### Teacher-Student relationship in many learning institutions



As ICT students continue with their studies, most schools offer advanced training in the form of internships and later hire them for specific jobs. Every organization employs qualified individuals to operate, maintain and run systems without interruptions. It is advisable to have a good backup plan that will restore data lost in case of a system failure, or the hardware is damaged. To prevent corruption of files, installation of anti-viruses is recommended; however, one should invest in a licensed anti-virus which will save the organization from data loss and speed up the system. By the 25<sup>th</sup> century, schools will be relying heavily on ICT globally. At the time, the cost of installation and maintenance will be reduced. Most people will have ample knowledge in the field and developing countries will have improved schools in the rural areas to accommodate ICT.

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